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Anatomical *and* Mechanical
LECTURES
UPON
DANCING.

WHEREIN

RULES and INSTITUTIONS
for that ART are laid down and
demonſtrated.

As they were Read at the

ACADEMY in *Chancery Lane.*

By JOHN WEAVER,
Dancing Maſter.

Spartam quam nactus eſt, hanc ornat.

LONDON:
Printed for J. Brotherton, *and* W. Meadows, *at the*
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Garden. M.DCC.XXI.

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TO

Mr. *CAVERLEY.*

SIR,

THE Motive that prevail'd on me to offer this *Dedication* to You, was not grounded ſo much upon a Principle of Gratitude, in return for Favours already receiv'd, which I take a

Pleaſure here to acknowledge; neither have I done it out of Compliment to You, as one of the firſt Maſters of our ART in the *Engliſh* School: But in regard, that I receiv'd the firſt Hints of theſe enſuing Lectures, which encourag'd this Undertaking, from the Succeſs I had obſerv'd in the Method You have introduc'd in Teaching.

WEIGHING nicely this Regularity and Conduct, that You have with ſo much Eaſe and Pleaſure reduced to Practice, it ſoon prevail'd upon my Reaſon to believe, That the ART of DANCING, by due Study and Application, was capable of ſuch Improvements, which in Proceſs of Time, would not only make it Valuable, as it is now known to be Neceſſary and Uſeful, but render it worthy the Regard and Conſideration, as well as Reflexion, of the learned World; ſince ſo many *Arts* and *Sciences* are conducive to its Perfection.

WHAT I have here barely attempted in *Theory*, You have already demonſtrated in *Practice*; and Your incomparable Method evidently ſhews You have the certain Rules of the ART, that make You ſo happy, as to anſwer the Expectations of all who have confided in You; and I perſwade my ſelf, that in the following Sheets I have ſhewn, That this Theory is derived from that

Practice and Method, now in Uſe by You, and others the eminent Maſters in this ART, from whence the Education of our young Gentlemen and Ladies have taken a much more advantagious Turn.

Your Excellence in the Art You profeſs; Your diſtinguiſhing Humanity; Your diſintereſted Friendſhip, and other agreeable Qualifications, gain You the Eſteem of all the Ingenious in our ART, and make You valuable to all Mankind that know You.

I am, SIR,

Your moſt obliged,

humble Servant,

J. WEAVER.

PREFACE.

THESE enſuing Lectures were attempted, in order towards the introducing the Art of Dancing *among the liberal Arts and Sciences; by laying down Fundamentals, and Rudiments, explaining the Laws of Motion, Mechanical and Natural, ſo far as they relate to the Regular, or Irregular Poſition, Motion, and Geſture of the Body, and Parts thereof.*

AND, *theſe Endeavours could not have been better tim'd, than, when the* Art of Dancing *is arriv'd to ſo great an Excellence; and when its Profeſſors, and Maſters, are become ſo eminent, that thoſe who employ them, are ſenſible, and daily confeſs, the vaſt Improvements they find in the Shape, Strength, and graceful Addreſs of their Children, from this admirably well adapted Exerciſe for Youth; in which the Growth* *of Infancy is encourag'd; the Beauty of a well regulated Motion is diſcover'd; and the Vigour of the Body is promoted; ſo that the* Art of Dancing *is not only of the greateſt Concern to Beauty; but of the laſt Conſideration to Health, which is one of the greateſt Bleſſings we enjoy.*

THE *two firſt Lectures, which are* Anatomical, *may not, perhaps, be ſo well reliſh'd by the Maſters in* Dancing, *at firſt View; but with a little Conſideration they will find (to go no farther) the Deſcription of the external Parts of the Human Machine; the wonderful Structure, and Poſition of the Bones; the Force, and Actions, of the Muſcles; to be not only worth their Obſervation; but of great Uſe towards illuſtrating the following Diſcourſes.*

AS *to Proportion, and Symmetry of Parts, 'tis abſolutely neceſſary we ſhould be well vers'd in them, that we may be capable of adding Grace and Beauty to the Poſition and Motions of a proportionate Body; and the more readily correct ſuch Defects, as may ariſe from the Miſformation of the Parts, or are contracted by Ill Habits,* &c.

THE *Mechanical Parts, upon Standing; Walking; and Springing; are partly taken from the Propoſitions of the learn'd* BORELLI, de motu Anamalium, *&c.*

AND *as theſe are the very Fundamentals of our Profeſſion, ſo they deſerve, nay, require, our utmoſt Obſervation; for, from the Regular or Irregular Poſition, and Motion of the Body, we diſtin-*

diſtinguiſh the handſome Preſence, and Deportment of the fine Gentleman, from the awkward Behaviour of the unpoliſh'd Peaſant; we diſcover the graceful Mien of a young Lady, from the ungainly Carriage of her Maid; and this Regulation even ſtamps Impreſſions on the Mind, which we receive from the outward Figure of the Body; for as the Soul is inform'd from the external Objects of Senſation, how careful ought we to be, to give the moſt agreeable Impreſſions, which cannot be affected without this Regularity; and how commendable, how advantagious is it, for a Gentleman, or Lady, to be Adroit *at every Step, and, that every Motion, and Action of the Body, be conſonant to Symmetry and Grace. 'Tis an elegant Way of touching the Paſſions which we call Addreſs; and, which renders the Perſon at firſt ſo agreeable.*

IN *laying down Rules and Inſtitutions in* Dancing, I *would not be thought to have invented ſuch Rules, or, to have advanc'd Inſtitutions, altogether before unknown to the Maſters eminent in this* Art; *for (among many Examples) to mention only* Mr. DE LA GARDE's *two Children, who, almoſt every Body has ſeen; 'tis plain, that they could never have arriv'd to ſo great a Perfection and Correctneſs in the* Art, *but from the regular Inſtructions of their Maſter; nor could Mr.* De la Garde *have inſtill'd ſuch Rules, and Principles of* Dancing, *into thoſe young Subjects, had he not receiv'd his juſt Notions, and firſt Inſtructions, from that great*

Maſter in every Branch of this Art, *Monſieur* L'ABBE'; *and I believe, after this, I may venture to ſay, our* Engliſh *School equals, in the inſtructive Part, any Place in* EUROPE; *and I wiſh I could ſay the ſame of our Practiſe, in relation to the Stage; though we have, at this Time, a better Set of Performers in* ENGLAND, *than, perhaps, it could ever boaſt of before; yet we may value our ſelves, that we have a* Dancer *in the Perſon of Mrs.* BOOTH, *where Art and Nature have combin'd to produce a beautiful Figure, allow'd by all Judges in our Art to be the moſt graceful, moſt agreeable, and moſt correct Performer in the World.*

TO *conclude, as Arts and Sciences have receiv'd no ſmall Additions, and Improvements, from the Genius of the* Engliſh *Nation; ſo I am in hopes ſome better qualify'd, may improve and compleat what I have but begun; and ſhould be oblig'd to any of our Profeſſion,* or *any other, who would rectify* or *amend any part of theſe Lectures; and correct wherein I have erred;* or *ſupply any Deficiency in this Undertaking.*

A
LIST
OF THE
DANCING MASTERS
Subsrcibers to this
UNDERTAKING.

Mr. *L'Abbé*

Mr. *Ayleworth*

Mr. *Barton*

Mr. *Beardwell* of Oxford

Mr. *Birkhead*

Mr. *Caverley*

Mr. *Couch*

Mr. *De la Garde*

Mr. *Eaſtland* of *St.* Edmonds Bury

Mr. *Eſſex, John,*
Mr. *Eſſex, William,*
Mr. *Firbank*
Mr. *Graham*
Mr. *Grieſdale*
Mr. *Haydock*
Mr. *Hale*
Mr. *Hele* of SALISBURY
Mr. *Holt, Walter,*
Mr. *Holt, William,*
Mr. *King* of JAMAICA
Mr. *Lally, Edmund,*
Mr. *Lally, Edward,*
Mr. *Orlabeer*
Mr. *Pemberton, Edmund,*
Mr. *Pemberton, James,*
Mr. *Shaw*
Mr. *Shirley*
Mr. *Stagg* of the BATH
Mr. *Topham*
Mr. *Tyrrill*
Mr. *Wade*

INTRODUCTION.

IT is expected, perhaps (*Gent.*) that by way of Introduction to theſe Lectures, I ſhould ſay ſomething in Behalf of this UNDERTAKING; and in reſpect to that *Art* which we profeſs.

BUT as I have already treated on the *Art* of *Dancing*, in relation to its Uſefulneſs as a Qualification and Exerciſe, I ſhall refer to that, and only beg leave to obſerve, that I was incited to this Attempt (in a great Meaſure) as I did imagine, it might be a Means of recovering our Art from a Contempt unjuſtly caſt upon it, by thoſe who term it only a trifling Amuſement.

NOT but that you *Gent.* of the Profeſſion (and it is with great Pleaſure I ſpeak it) by the great Improvements you have made in this Art, as to the Method of Teaching; your prudent Conduct and Management, of thoſe (eſpecially the

Ladies) under your Care; your obliging Behaviour to all; and the good Order, and Oeconomy, you have introduc'd into our Boarding Schools, have already rais'd our Art to a much higher Pitch of Reputation, than it formerly appear'd among us.

So that I flatter my ſelf, this Undertaking will derive to our *Art*, that Eſteem ſo juſtly due to its Merit, and eſtabliſh a Reputation equal to its Deſert; when the Art of *Dancing* is ſet in ſuch a Light, as may make it appear to the Ingenious, to be not only uſeful, and abſolutely neceſſary to all; but alſo, that it is not unworthy of being introduc'd among the liberal Arts and Sciences, ſince we ſhall be able to prove, That the Rules and Inſtitutions of our Profeſſion are built upon the Fundamentals of *Anatomy*; agreeable to the Laws of *Mechaniſm*; conſonant to the Rules of *harmonical Proportion*, and adorn'd with the Beauty of a natural and cultivated *Gracefulneſs*.

Ana-

Anatomical *and* Mechanical LECTURES UPON DANCING.

AS the Human Body, the moſt perfect of all others, and the Maſter-piece of Nature, will have the greateſt Share in the Subject treated upon in the enſuing Lectures; I am perſwaded, nothing can be more agreeable to us, than a View of the Component and External Parts thereof, as they appear in the Living State. But ſince we do not intend an intire Courſe of Anatomy, we ſhall confine our Obſervations only to thoſe peculiar Parts, which are abſolutely neceſſary towards cultivating that Art we profeſs, and are willing to improve; and ſhall not trouble our Auditors with thoſe Definitions, Diviſions, *&c.* that are made uſe of by *Anatomiſts* of the Parts of Human Body, and are, as we yet conceive, altogether needleſs and foreign to our Deſign.

Caput. Abdomen WE ſhall divide the Body into four Parts (*viz.*) the *Head*, the *Thorax*, the *Belly*, and the *Limbs* (that is to ſay) the *Legs* and *Arms*.

THE *Head* is the nobleſt Part of the Body, as containing the *Brain*, wherein the Rational Soul more eſpecially operates, and whereby all the animal Motions of the Body are moderated and determin'd.

IT is ſeated in the uppermoſt Part of the Body, becauſe there the Organs of the Senſes are ſeated; and from ſo advantagious a Situation, the Eyes, as from an Eminence, behold Objects diſtant and remote: The Ears receive the various Sounds that circling riſe and fly aloft: And the Noſtrils attract and draw in the aſcending Odors.

Calvaria. Cranium. THE *Head* is divided into two Parts (*viz.*) that which is *Hairy*, and that which is *Smooth*; the former is call'd the *Skull*, and the latter the *Face*.

THE Parts of the *Hairy Scalp* are Four; the Fore-part, the Hind-part, and two *Temples:* In the middle is the Tempora. *Crown*, ſituated on the Top of the Vertex. *Head.*

THE ſmooth Part is call'd the *Face*, and this is well worth our Obſervation; for here moſt of the Senſes are lodg'd, and the Face may not improperly be term'd the Image of the Soul: Anger and Scorn are ſeated on the Brow: The Eyes expreſs the Sentiments of the Heart; and every Paſſion of the Mind is diſcover'd in the Countenance: Here too, in Females, the irreſiſtable Charms of Beauty reign, tyrannize, and triumph, over the Heart of Man. The *Face* comprehends all that Part which begins at the Fore-part of the Head, where the Hair Frons. ends, and terminates at the *Chin:* The Parts of the Face are the *Brow*, or *Forehead*; the *Ears*, the *Eyes*, the *Cheeks*, the *Noſe*, the *Philtrum*, and its ſide; the *Lips*, the *Mouth*, and the *Chin.* I cannot but obſerve to you, That the Skin of the Forehead is only Moveable, on which appears certain Lines, which, when the Forehead is contracted, are call'd *Wrinkles.*

UNDER the Head you ſee a certain Round and Oblong Part of the

Figure of a Cylinder, extending downwards
to the Shoulder, and plac'd betwixt
the upper and lower Regions of
Collum. the Body, which is call'd the *Neck*:
Claviculæ It reaches from the Head to the *Channel
Bones*, and is divided into the Anterior
and Poſterior Parts: The Anterior,
Jugulum. or Fore-part, is the *Throat*, along
Trachæa. which deſcends the *Wind-pipe* and the
Oeſophagus. *Gullet*: The Poſterior, or Hind-part
of the Neck, reaches from the Hind-
Scapulæ. head down to the *Shoulder Blades*.

NEXT, immediately under the
Neck, is the *Thorax*; it is diſtinguiſh'd
into three Parts, the Anterior,
the Poſterior, and the Lateral: The
Anterior, or Fore-part, is call'd the
Pectus. *Breaſt*, or *Cheſt*, on which are the
Claviculæ *Channel Bones*. On the Fore-part of
the *Cheſt* are plac'd the *Breaſts*, which
Mammæ. are two round *Glandular Tumors*; they
are much larger in Women than in
Men: The ſmall and round Prominency
Papilla. in the Centre is call'd the *Nipple*,
which is encompaſs'd with a reddiſh
Circle, call'd *Areola*.

THE Poſterior, or hinder Part of the
Thorax, which is ſeated oppoſite to the
Dorſum. *Breaſt*, is call'd the *Back*; it begins at
the *Neck*, and reaches down to the end
Coſtæ. of the *Ribs*, and to the beginning of the
Loins: It is compos'd of twelve *Vertebræ*,

Scapulæ.

bræ, or Joints, and the *Shoulder Blades.* The *Shoulders* are two ſuperior Prominencies ariſing from the broad Bones of the *Shoulder Blades*, and form the upper part of the Back; and the *Vertebræ*, or ſpinous Protuberancy, extending all along the whole length of the Back, divide it into the right and left Parts.

The two lateral Parts are plac'd betwixt the Anterior and the Poſterior: They begin under the Arm-pits, and terminate with the Ribs; ſo that theſe *Latera*, or Sides, are diſtinguiſh'd into the Right and Left.

Abdomen

The third Part is ſeated in the lowermoſt Part of the Trunk of the Body, and is of a ſoft and carneous Subſtance, it is call'd the *Belly.*

Venter.

Nates.

It is diſtinguiſh'd into the Anterior and the Poſterior Parts: The Anterior begins at the lower Point of the *Breaſt*, and extends to the *Pudenda*, and is call'd the *Belly.* The Poſterior is the hinder Part, or Back-ſide; it reaches from the laſt Ribs to the Extremity of the *Os Sacrum*: It is divided into two Parts; the upper is call'd the Small of the Back; its Sides the Loins; and the lower End the *Anus*; and its Sides the *Buttocks*, which are very large, and of a fleſhy Subſtance.

We call thoſe Parts of our Body, which branch out from the Trunk, like the Branches of Trees, the *Artus* or *Limbs:* Theſe are the *Hands* or *Feet.* The firſt are divided into three principal Parts (*viz.*) the *Arm*, the *Cubit*, and the *Hand* (properly ſo called): The *Arm* is that part, which beginning at the Joint of the Shoulder, reaches to the next Joint, or the *Flection of the Elbow*, which is the Place where we bend our Arm; oppoſite to which is the Tip of the Elbow. The *Cubitus* or *Fore-Arm* are thoſe Parts, which from the Extremity of the *Arm* extend to the *Wriſt*, or to the *Hand*, properly ſo call'd: And this *Hand* begins at the Extremity of the *Cubitus*, and terminates at the Extremity of the *Fingers*. The *Hand* is ſub-divided into three Parts (*viz.*) the *Carpus* or *Wriſt*, the *Metacarpus* and the *Digiti:* The *Carpus* or *Wriſt* is that Part of the *Hand* which is next adjacent to that part which joyns the broad part of the *Hand* to the *Elbow.* The *Metacarpus* is ſituated betwixt the *Wriſt* and the Root of the *Fingers:* The inſide is the *Palm* of the *Hand*; the outſide is call'd the *Back* of the *Hand:* On each *Hand* there are five Fingers, two of which have obtain'd their

Humerus.

Cubitus.

Flexura, Ulnæ.

Olecranum.

Carpus.

Names from the Magnitude, and the other three have theirs from their Poſition and Function: The *Thumb* is ſo call'd, becauſe it exceeds in Bigneſs and Strength all the reſt; the other *Finger*, that has borrowed its Name from its Magnitude, is the *Little Finger*; the next to this is call'd the *Middle Finger*; the other is call'd the *Ring Finger*. On the Extremity of the *Fingers* are *Nails*. Pollex. Minimus.

THE whole *Leg* is the next and laſt that comes under our Obſervation, upon the External Parts of Human Body. Under this Name is comprehended all that Part, which beginning at the *Buttocks*, reaches to the utmoſt Extremities of the *Toes*, and which is divided into three Parts (*viz.*) the *Thigh*, the *Leg*, and the *Foot*, properly ſo called: The firſt Part, which is the *Thigh*, is from the *Hip* to that Joint, of which the Fore-part is call'd the *Knee*, and the Back-part the *Ham*; and the Space between the two *Thighs*, which is adjacent to the *Buttocks*, is call'd the *Perinæum*. Nates. Femur, Tibia, Pes. Genu.

THE ſecond Part of the *Leg* has its Fore-part, nam'd the *Shin*, and the Back-part, the *Calf* of the *Leg*: On the ſuperior Part of the *Leg* is a Joint, where it is articulated with the *Thigh* Bone, which is call'd the *Knee*. In the Fore-part (or rather the Bone it ſelf) that covers the Knee, is the Rotula. *Knee-Pan.* In the lower Part, where the *Leg* is joined with the *Foot*, there are two Eminencies, which are call'd the outer and inner *Ankles* of the Foot.

The third Part is the *Foot* (properly ſo call'd) which beginning at the Leg, ends at the very points of the *Toes*. It is divided, like the Hand, into three Parts (*viz.*) the *Tarſus*, *Metatarſus*, and the *Toes*. The *Tarſus* is from the *Ankles* to the *Metatarſus*; the *Metatarſus*, or Breadth of the Foot, goes to the Root of the Toes; the upper Part of the *Foot* is call'd the *Inſtep*, and the under Part is call'd the *Sole* of the *Foot*. The third Part contains the *Toes*, which correſpond to the *Fingers* of the Hand.

The whole Strength of the *Foot* reſts on the Great *Toe*, in *Dancing* or *Vaulting*.

Having deſcrib'd unto you the External Parts of the Human Body, I ſhall endeavour to ſpeak concerning the Bones, as the Baſis and Foundation-Pillars of the Body: But before I enter upon the Particulars, as the *Poſition*, *Beginning*, *Termination*, and *Figure* of theſe Parts, it will be requiſite firſt to premiſe a Word or two in General concerning the *Bones*, as to their *Nature*, *Uſes*, and *Differences*.

A BONE is a Part of the Body that exceeds all the other Parts in Hardneſs, and Drineſs, and is form'd for the Support or Defence of the other Parts. The *Bones* are made of hard Fibres faſten'd to one another, by ſmall tranſverſe Fibres; and all thoſe *Bones*, which are of any conſiderable Thickneſs, have either a large Cavity, or elſe ſmall Cells; they are alſo cover'd with a thin, ſtrong, and very ſenſible Membrane, call'd the *Perioſteum*: Each of the larger *Bones* is bigger at its Extremities than in the middle, for the better Articulation of the Joints: But becauſe the middle of the Bone requires a ſufficient Strength, both to ſupport the Weight of the Body, and to reſiſt any outward Violences, the Fibres here are very cloſe and compact, and the Bone is hollow within, and conſequently not ſo eaſily broken, as it muſt have been had it been ſolid and ſmaller.

AS to the Uſes of the *Bones*, they are not only a Support and Foundation of the Body, and a Defence to the vital Parts from external Injuries; but they alſo impart Shape and Figure to the whole Body, and are aiding to, and facilitate the Action of a certain Organ.

AS to their Figure, ſome are like a Triangle, as the *Scapulæ*, or *Shoulder Blades*; ſome Quadrangular, as thoſe of the Forehead;

others a Pentagon, as the Hind-part of the Head; one like a Cube, another like a Boat; and the *Claviculæ* like a crooked Nail, *&c.*

As to their Subſtance, ſome are hard as the *Tibia*; others leſs hard, as the *Vertebræ*; and others ſoft and ſpungy, as the *Sternum.*

A Great Diverſity is alſo to be obſerv'd in the *Bones*, in reſpect to their *Meatus*, or Cavities, for ſome have a very large Cavity, as containing the Marrow; others have ſmall Caverns, ſpongious, like a Pumice Stone, and ſome have Holes for the Paſſage of the Veſſels, *&c.*

A Considerable Variety is to be ſeen, in reference to their Magnitude; for ſome *Bones* are very large, as thoſe of the Thigh, Leg, and Arm; others leſs, as the *Radius* and the *Cubitus*, and thoſe of the Head; and ſome ſtill leſſer, as thoſe of the Fingers, *&c.* Some, again, are long and ſlender, and others broad, *&c.* The Magnitude of the *Bones* does not only differ in Men of different Stature, but alſo in thoſe who are alike in Height; and it happens ſometimes, that among the latter, you ſhall ſee their *Bones* differ very much in bigneſs; and if Beauty depends on the ſlenderneſs of the *Bones*, ſuch as have the ſmalleſt, muſt, according to this Rule, be beſt ſhap'd; and certain it is, that one Reaſon why Women are, generally ſpeaking, much handſomer than the Men, is, becauſe the *Bones* of their Face are ſmaller, and finer made, than thoſe of Men; from hence it follows, That the Skeleton of a Woman will be eaſily diſtinguiſhed from that of a Man. The Order of Nature is very peculiar in reſpect to their Number, being juſt as many, and neither more, or fewer, than are requiſite to perform the Functions in the Parts. I ſhall conclude theſe Differences of the *Bones*, with their Difference as to Motion; ſome have a more manifeſt Motion; others have a leſs, as thoſe of the *Tarſus* and *Carpus*; others none at all, as thoſe of the Head.

ON the external Surface of the *Bones* there are ſeveral Cavities and Protuberancies: The Cavities are of two Sorts, either narrow and ſhallow, or wide and deep; the firſt is call'd *Glene*, the ſecond *Cotyle*; and both of theſe Kinds that ſerve for Articulation, have a Prominency on their Circumference, call'd the Lip, unto which is faſten'd a circular Ligament, which incloſes the Head of the Bone which they receive, and ſerves to ſtrengthen the Articulation, and to prevent Luxations, which would otherwiſe frequently happen.

THE Protuberancies are alſo of two Sorts, (*viz.*) the *Apophyſes* and the *Epiphyſes*.

THE Bone has beſides theſe another Part, call'd the principal Part, which is the hardeſt, and moſt ſolid part of the Bone, and takes up the greateſt part of it, as in the *Femur*, or *Thigh-Bone*; all that lies betwixt the Extremities, which are the *Apophyſis*, and *Epiphyſis*, is the principal part of the Bone.

The *Apophyſis* is a Prominency, or Protuberancy, ariſing, or jetting from the Surface of the *Bone*, and made by the Fibres of the Bone, the Uſe of which is to facilitate the Articulation of the *Bones*, and ordain'd for the more commodious, and ſtrong Inſertion of the Tendons of the Muſcles, and is uſually call'd a Proceſs.

The *Epiphyſis* is a Protuberance made by a ſmall Bone, joyned, or ſet upon the Extremity of a bigger Bone, which, as we advance in Age, unite into one, but is generally more porous than the Bone it ſelf, and is often call'd an *Apendage:* Its Uſe is to ſtrengthen the Articulation, and to be ſerviceable, as well as the *Apophyſis*, to the Inſertion of many Muſcles and Ligaments.

All their Difference is from their Figure. If the Protuberance be large and round, it is call'd *Caput*, the *Head*; and the Part immediately under it *Cervix*, the *Neck*; as in the ſuperior part of the *Thigh-Bone*; but if it be ſmall and round, then it is call'd *Condylus*; and if it be a ſharp or pointed Protuberance, it is call'd *Corone*; others from their Figure take the Names of *Styloides*, *Coracoides*, *Ancyroides*, &c.

The *Bones* are articulated, or joyn'd to one another, either with a manifeſt Motion, or with a ſmall and obſcure Motion, or without any Motion at all. There appears ſo much

Art in the Conjunction of the *Bones*, that they have ſerv'd as Patterns to our Handicraft Tradeſmen in their moſt curious Works. And were it not for ſuch various Articulation, and Conjunction of the *Bones*, we could never move our ſelves ſo compleatly as we do.

THE firſt Sort of Articulation is call'd *Diarthroſis*, or looſe Articulation; the ſecond *Synchondroſis*; and the laſt *Synarthroſis*.

OF the *Diarthroſis* there are two Sorts, *Enarthroſis* or *Arthrodia*, and *Ginglymus*. The firſt is, when a round Head of a Bone is received into the round Cavity of another; ſuch as the Articulation of the *Thigh-Bone* in the *Acetabulum Coxendicis*; or the *Shoulder-Bone*, with the *Scapula*: And this Sort of Joyning is call'd by Tradeſmen Ball and Socket: The Property of this Joyning is, that the Parts ſo articulated are capable of all Sorts of Motion, as upwards, downwards, forwards, backwards, and circularly.

THE *Ginglymus* is, when a Bone both receives, and is receiv'd; and the Property of this Sort of Articulation is to admit only of the Motions of Flexion and Extenſion. It is call'd by Tradeſmen *Charnel*, and is commonly us'd in Hinges. Of this Articulation there are three Sorts. The firſt, when the end of a Bone has two Protuberancies and one Cavity; and the end of the Bone with which it is articulated has two Cavities and but one Protuberance, as the lower part of the *Os Humeri*, or *Shoulder Bone*, and the *Ulna*. The ſecond is, when a Bone at one Extremity receives another Bone, and at its other Extremity is receiv'd by the ſame Bone, as the *Radius* and *Ulna*. The third Sort is, when a Bone at one end receives another Bone, and at the other end is receiv'd by a third Bone, as the *Bones* of the *Vertebræ*.

THE ſecond Sort of Articulation, which is call'd *Synchondroſis*, is, when the Extremities of two *Bones* are joyn'd to one another by means of an intervening *Cartilage*.

A CARTILAGE is a ſmooth and ſolid Body, not ſo hard as the Bone, and harder than a Membrane; it is what we call a Griſtle, and is Elaſtick, and if preſs'd, or forc'd from its natural Situation, will, when ſuch Force is remov'd, return to its priſtine State.

THE third Sort of Articulation is call'd *Synarthroſis*, of which we ſhall make no farther mention, as being no ways relating to our Purpoſe.

THE Extremities of the *Bones*, that are joyn'd together for manifeſt Motion, are tied and bound together with membranous Ligaments, which riſe from the Conjunction of the *Epiphyſis* with the Bone, and paſſing over the Articulation, are inſerted in the other Bone at the ſame Place, and form a ſort of Bag, which embraces all that part of the Extremities of both Bones which play upon one another; in this Bag a Mucilage is contain'd, for the eaſier Motion of the Joint. The *Bones* articulated by *Ginglymus* have the Ligaments ſtronger on their Sides than before or behind, that the Protuberancies may play true in their Cavities, for if they might ſlip the leaſt to either ſide, the *Bones* would be frequently diſlocated.

THE whole Structure of the *Bones* being thus artificially joyn'd to one another, forms the Skeleton; the greateſt part of which we ſhall in Particulars preſent to your View, and from them fully inſtruct our ſelves in all that will be requiſite for us to know, in relation to this Day's Lecture.

THIS Skeleton we ſhall divide into the *Head*, the *Neck*; and *Trunk*, and the *Limbs*.

THE *Head*, ſo far as it is neceſſary to our Purpoſe, may be divided into the *Skull* and *Face*. The *Skull* is compos'd of ſeveral *Bones* forming a Cavity, which contains the Brain; but concerning the Figure of theſe *Bones*, or their *Foramina*, or *Sutures*, I ſhall make no farther Enquiries than is abſolutely neceſſary to my Deſign, and for that Reaſon ſhall only mention the *Os Occipitis*, a large Bone forming the hinder Part of the Head, and which is articulated with the firſt *Vertebra* of the Neck, and to which the ſmall Muſcles for the Motion of the Head are faſten'd. This Bone has two *Apophyſes*, which are lin'd with a *Cartilage*, and articulated with the firſt *Vertebra* of the Neck: It has alſo a Protuberance in the middle, from which there goes a ſmall Ligament, which is inſerted into the firſt *Vertebra* of the Neck.

THAT Chain of *Bones* from the Head, compoſing the Neck, Back, Loins, *Os Sacrum*, and *Coccygis*, have altogether obtain'd the general Name of the *Spine*, and are call'd the *Vertebræ*; for ſince 'twas neceſſary the Head and Body ſhould be variouſly mov'd, it was requiſite their Supporter ſhould not conſiſt on one Bone only, for then that Bone would have been ſtrait, and ſtiff as a Stake, without being capable of bending; nor would it have anſwer'd the Uſes for which it was deſign'd, had its Compoſition been of two, three, or four *Bones*, for then of Neceſſity it muſt, when bent, have made acute Angles in all the Places of ſuch Flections and Articulations, and conſequently have compreſs'd the Marrow of the Spine, and binder'd the free Courſe of the animal Juice into the Extremities of the Nerves; therefore the Divine Architect has ordain'd and fram'd this wonderful Complex of many *Bones*, joyn'd and articulated together by ſtrong Ligaments, by means of which it eaſily moves on all ſides without incommoding in the leaſt the *Medulla Spinalis*, which it contains, nor the Parts of the *Thorax*, nor of the *Abdomen*, which it touches.

THESE *Vertebræ* are in Number Twenty four (*viz.*) ſeven belonging to the Neck, twelve to the Back, and five to the Loins, beſides thoſe of the *Os Sacrum* and *Coccygis*, which compoſe the poſterior Part of the Spine. The Figure of the whole Spine, at firſt ſight, ſeems to be ſtrait, but rightly conſider'd, we ſhall find that thoſe of the Neck bends inwards, for the better Support of the Head and *Oeſophagus*. Thoſe of the Back bend outward, to enlarge the Capacity of the *Thorax* and *Abdomen*; and thoſe of the Loins bend a little inward, to defend the great Veſſels, and to ſupport more conveniently the Weight of the Body. The *Os Sacrum* inclines outwards again, and the *Os Coccygis* inward.

As theſe *Vertebræ* riſe higher upward they loſe inſenſibly their Bulk, ſo that the Column ends pyramidal. In each of the *Vertebræ* there are two diſtinguiſhable Parts *(viz.)* the Body and the *Apophyſes*. The Body is a bony Subſtance, porous and ſpongeous, which adds to its Lightneſs; it is even and flat at its Extremities, the better to unite them, and to reſt upon and ſupport one the other: It is of a Convex Figure forwards; and backwards ſomewhat Concave, and plain above and below, each cover'd with a Cartilage which is pretty thick forward, but thin backward; by which means we bend our Bodies forwards; for the Cartilages yield to the Preſſure of the Bodies of the *Vertebræ*, which in that Motion come cloſer to one another, and gives them a more eaſie Motion; the Body alſo of each *Vertebra* increaſes gradually in Bulk to the very *Os Sacrum.*

THE *Apophyſes* or *Proceſſes* are certain bony Elongations, harder and more ſolid than the Body, and which form the poſterior Part of the Spine of the Back.

EACH *Vertebra* has ſeven of theſe Proceſſes; four Oblique; two on the upper Part, and two on the lower Part; two Tranſverſe or Lateral, on each ſide one, in each of which there is a Tendon of the vertebral Muſcles inſerted; and one Acute, called the Spine or *Spinatus*, and has given the Name of the Spine to the whole Column. Each of theſe *Vertebræ* is alſo perforated in the middle by a large Hole; ſo that all the *Vertebræ* being plac'd one upon another, and theſe Holes being plac'd exactly one to another, do form a long Conduit or Pipe, through which the ſpinal Marrow does paſs, even to the very *Os Sacrum*: This Pipe is equally big at the one end as the other. Theſe *Vertebræ* have alſo five *Epiphyſes*, two on the Body, two on the Extremities of the tranſverſe Proceſſes, and one at the Extremity of the pointed Proceſs. Theſe *Vertebræ* are joyn'd to one another by a ſort of *Ginglymus*, and their Bodies by *Synchondroſis*. Now, tho' the *Ginglymus* has no other Motion than Flexion and Extenſion, yet the Spine, by Reaſon of their Heads and Cavities, being flat and ſuperficial, and their Articulations looſe, move a little ſide-ways to the right and to the left.

THE two deſcending oblique Proceſſes of each ſuperior *Vertebra* of the Neck and Back, have a little dimple in their Extremities, wherein they receive the Extremities of the two aſcending oblique Proceſſes of the inferior *Vertebræ*; ſo that the two aſcending Proceſſes of each *Vertebra* of the Neck and Back are received, and the deſcending do receive, except the firſt of the Neck. The Articulation, as I have obſerv'd before, made by the Body of the *Vertebræ*, is a *Synchondroſis*, becauſe it is made by means of a Cartilage, which facilitates and accelerates the Motions of the Spine, and prevents the *Vertebræ* from rubbing one againſt another. The *Vertebræ* are all faſten'd together by a hard Membrane, conſiſting of large and ſtrong Fibres; the Channel or Concavity is alſo lin'd with a Membrane, and ties them all together. Thus much of the *Vertebræ* in general, but ſhall only obſerve, That tho' the Motion of the whole Spine in general is very evident, yet that of each *Vertebra* in particular very inconſiderable. We ſhall now proceed to a more particular Examination.

THE Head moves only backwards and forwards upon the firſt *Vertebra*, and ſemicircular upon the ſecond. A ſmall Protuberance in the Bone of the Hind-head falling upon another in the firſt *Vertebra*, ſtops the Motion of the Head from falling too much backward, that it might not impair the ſpinal Marrow; and when the Chin touches the *Sternum* it can move no farther forwards.

THE firſt *Vertebra* of the Neck is call'd *Atlas*, upon which the Head, like a little World, reſts, and is moſt firmly united to it, and moves with it, upon the ſecond, ſemicircularly; it has no acute or ſpinous Proceſs, that it might not interrupt the Action of the ſmall Muſcle, call'd *Muſculus Rectus*, which goes from the ſecond *Vertebra* to the *Occiput*, but it has a ſmall Tubercle only, unto which the ſmall Ligament of the Head is inſerted. Its aſcending oblique Proceſſes receive the Tubercles of the *Occiput*, upon which Articulation, which is a ſort of double *Arthrodia*, the Head is mov'd only backward and forward; and its deſcending Proceſſes receive the aſcending Proceſſes of the ſecond *Vertebra*; it has a very little Body, and in the fore-part of its great Hole it has a pretty large *Sinus* or Cavity, to receive the *Dens* or *Tooth-like* Proceſs of the ſecond *Vertebra*; this Cavity is lin'd with a ſtrong Ligament which faſtens the aforeſaid *Dens*, that it might not compreſs the *Medulla Spinalis*.

IT has two ſmall *Sinus*'s in its upper Part, in which the tenth Pair of Nerves, and *Vertebral* Arteries lye. Tho' this *Vertebra* is ſmaller than either of the reſt, yet it is at the ſame time more hard and ſolid; for it was requiſite it ſhould be very thin to afford a larger Cavity for the Paſſage of the Marrow; and it was neceſſary the great *Foramen*, or Hole of this *Vertebra*, ſhould be larger than any of the reſt, leaſt the beginning of the ſpinal Marrow ſhould be incommoded in turning the Head to one ſide, in which Action this *Vertebra* moves with the Head on the *Tooth-like* Proceſs of the ſecond *Vertebra.*

THE ſecond *Vertebra* is call'd *Epiſtrophæus* or *Dentata*, becauſe in the middle, between its two oblique aſcending *Proceſſes*, ſprings a long, round, and hard Proceſs, like a Tooth, call'd *Dens*, which is receiv'd into the aforemention'd *Sinus* of the firſt *Vertebra*; and upon this Tooth, the Head, with the firſt *Vertebra*, turns half round as upon an *Axis.* The Extremity of this Proceſs (which is ſomewhat unequal) is knit to the *Occiput* by a ſmall, but ſtrong Ligament. A Luxation of this is mortal, and when it happens the Neck is ſaid to be broke, which ariſes from its Compreſſion of the *Medulla Spinalis.* The oblique, or ſemicircular Motions, are limited by the Ligament which ties the Proceſs of this *Vertebra* to the Head; and by thoſe which tye alſo the firſt *Vertebra* to it.

THE third *Vertebra* is call'd *Axis*, and the four following have no particular Name, nor any peculiar Difference, only encreaſing a little in bigneſs, having their lateral Proceſſes broader than the reſt, and forked; their Spines are alſo fork'd, for the ſtrengthening the Connexion of the Muſcles, except that of the laſt, beginning to grow ſomewhat like thoſe of the Back. The Motion of theſe *Vertebræ* are not ſo manifeſt, yet greater than thoſe of the Back, becauſe their acute Proceſſes are ſhort and ſtrait, and the Cartilages which are between their Bodies thicker. All theſe *Vertebræ* of the Neck have two ſmall Holes each, which lie in the Head of the tranſverſe Proceſſes, and thro' which the *vertebral* Arteries paſs; and the ſuperior oblique Proceſſes are ſomewhat hollow to receive the inferior Convex ones, for the freer Motion of the Neck.

THE Back has twelve *Vertebræ*, which are larger than thoſe of the Neck, and ſmaller than thoſe of the Loins; their ſpinal Proceſſes are not forked, but pointed, and lie one over the other. The *Vertebræ* of the Back have this peculiar to them, that on each ſide of their Bodies they have a *Sinus* very ſuperficial, and inveſted with a Cartilage, wherein the round Extremities of the Ribs are receiv'd; and another ſuperficial *Sinus* alſo inveſted with a Cartilage plac'd on their tranſverſe Proceſſes, which receives the little Tubercle near the Extremity of the Ribs. The Motion of theſe *Vertebræ* of the Back is obſcure, their Cartilages being thin, and their acute Proceſſes long, and very near to one another; and they are fix'd to the Ribs which neither move forwards or backwards.

THE five *Vertebræ* of the Loins differ from the reſt in this, that they are the broadeſt, and the laſt of them the largeſt of all the *Ver-*

Vertebræ: Their acute Proceſſes are broader, ſhorter, and wider from one another; their tranſverſe are more long and fine than thoſe of the Back, to ſupport the Bowels and Muſcles of the Back; they are not perforated as thoſe of the Neck; nor have they a *Sinus*, or Dimple, as thoſe of the Back: The Cartilages which are betwixt their Bodies are thicker than any of the reſt. Theſe Spines are not equal in their Magnitude in reſpect to one another; for as the *Vertebræ* are bigger in their Bodies, as they are lower in Poſition; ſo, on the contrary, the Spines are bigger, as their Poſitions are higher; ſo that the biggeſt *Vertebræ* have the leaſt Spines, and the lowermoſt *Vertebra*, which is the biggeſt of all, has conſequently the ſmalleſt Spine. Theſe *Vertebræ* belonging to the Loins are diſpos'd in ſuch a manner, as to be capable of all ſorts of Motion; and the greateſt Motion of the Back is perform'd by theſe *Vertebræ*, becauſe their Cartilages (as we obſerved before) are thicker, and their acute Proceſſes at a great diſtance from one another, for the thicker the Cartilages are, the more we may bend our Bodies forwards; and the greater diſtance there is between the acute Proceſſes, the more we may bend our ſelves backward.

'Thus have we deſcrib'd the admirable 'Structure and Motion of the *Vertebræ* of the 'Neck, Back, and Loins, when they are in 'their natural Poſition; but in ſome People

' the *Vertebræ* are ſeveral Ways diſtorted; as if the *Vertebræ* of the Back ſtick out, ſuch are ſaid to be hunch'd back'd; and, in ſuch the Cartilage between the *Vertebræ* are very thin and hard forward, but conſiderably thick backwards, where the oblique Proceſſes of the ſuperior and inferior *Vertebræ* are at a conſiderable diſtance from one another, which diſtance fills up with a viſcous Subſtance. This Inequality of the thickneſs of the Cartilages, happens either by a Relaxation, or Weakneſs of the Ligaments and Muſcles, which are faſten'd to the backſide of the *Vertebræ*; in which Caſe their Antagoniſts finding no Oppoſition, remain in a continual Contraction, and conſequently there can be no Motion in theſe *Vertebræ*: This Deformity has ſometimes its Origine from the Womb; then the *Bones* being at that Time ſoft and tender, the Bodies of the *Vertebræ* partake of the ſame Inequality as the Cartilages. If the Bunch be towards one Shoulder; for Example, towards the Right; then the Cartilages on that ſide are very thick, but thin and dry on the other ſide; on the left ſide the oblique Proceſſes come cloſe together, but on the right there is a conſiderable diſtance betwixt them; and the Ligaments and Muſcles are greatly extended on the right ſide; but thoſe on the left are as much contracted. If the *Vertebræ* are diſtorted inwards, all Things 'have a different Face. The Cartilages, and 'ſometimes the *Vertebræ*, are very thick for'wards, but mighty thin and hard back'wards. The acute and oblique Proceſſes are 'very cloſe to one another, and the Liga'ments upon the Bodies of the *Vertebræ* are 'greatly relax'd, but the Muſcles and Liga'ments which tye the Proceſſes together are 'very much contracted. If theſe Diſtortions 'happen in the *Vertebræ* of the Loins, the 'miſerable Patient has little or no Motion in 'his Back*.

As the reſt of the *Bones* belonging to the Trunk are without any Motion, it will be ſufficient for us to know, that the *Os Sacrum* adjoyning to the *Vertebræ* of the Loins, conſiſts of four, five, or ſix *Vertebræ*, which in adult Perſons make in effect but one large ſolid Bone of a triangular Figure, with the Point downwards; concave and ſmooth on its foreſide, and convex and unequal on its backſide; it's immoveable, and ſerves not only as a Baſis and Foundation to ſupport the whole *vertebral* Frame, but alſo gives riſe to many Muſcles. To the Extremity of the *Os Sacrum* is joyn'd the Bone *Coccygis*, by ſome call'd the *Rump Bone*; it is compos'd of two or three little *Bones* of a looſe Articulation, ty'd to one another by Cartilages, the laſt is the ſmalleſt.

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* *Keil*, page 265.

THE Ribs are in Number Twenty four, twelve on each ſide of the twelve *Vertebræ* of the Back; they are partly bony, and partly cartilaginous; they are crooked, concave inward, and convex outwards, and articulated by their Extremities both to the *Vertebræ* of the Back and Breaſt; that with the Back is moveable, the other not: The ſeven ſuperior Ribs are joyn'd to the *Sternum*, and the other five by Cartilages adhering to the ſuperior. The Ribs defend the Heart, Lungs, *&c.* from external Injuries, and ſerve to ſuſtain the Muſcles of Reſpiration.

THE *Sternum*, or *Breaſt Bone*, is ſituated in the middle of the Breaſt; on its upper Part it has a *Sinus* on each ſide, which receives the Heads of the *Claviculæ*: At its Top it has a lunated *Sinus* call'd *Jugulum*; below, on its ſides, it has ſeveral *Sinus*'s, which receive the Extremities of the Ribs: At the lower End is annex'd a Cartilage pointed at the end, and call'd *Cartilago Xiphoides*; *vel Mucronata*; or *Enſiformis*; the Sword-like Cartilage. The *Sternum* is of a triangular Figure, and immoveable, it defends the Heart, receives the *Claviculæ*, and unites the Ribs, that their Motion may be all at one and the ſame Time.

THE *Claviculæ*, or *Collar Bones*, are two, and ſituated above the Breaſt, one on each ſide; at one end they are articulated with the *Scapulæ*, or *Shoulder Blade*, by *Synchondroſis*;

and at the other end to the upper part of the *Sternum*, by *Arthrodia*; their Figure is like an *Italian* ſ; the crookeder theſe *Bones* are, the more force and agility has the Arm: Their Uſe is, to uphold the *Scapulæ* and *Humerus* from falling on the Breaſt, and to facilitate the Motion of the Arm. And becauſe the pectoral Muſcle, which pulls the Arm acroſs the Breaſt, is inſerted near the upper end of the Shoulder Bone; therefore if the *Claviculæ* did not keep the *Scapulæ*, to which the Head of the *Humerus* is joyn'd, always at an equal diſtance from the *Sternum*, the upper part of the Arm, and not the Hand, muſt have been pull'd forwards.

We ſhall conclude with the *Bones* of the Trunk, in a Deſcription of the *Oſſæ Innominatæ*, from their ſtrange Figure. They are joyn'd to the Extremities of the *Os Sacrum*; and Anatomiſts divide each of theſe *Bones* into three Parts; the firſt and ſuperior Part is called *Os Ilium*, from its External ariſe the *Muſculi Glutæi*. The ſecond, *Os Pubis*. And the third, and inferior, the *Iſchium* or *Coxendix*. This laſt has a large Cavity, call'd the *Acetabulum Coxcendicis*, which receives the Head of the Thigh-Bone; the Circumference of this Cavity is inveſted with a Cartilage call'd its *Supercilium*, or Brow, where it joyns the *Os Pubis*: It has alſo a large Hole call'd *Foramen Iſchii*, and *Pubis*, about the Circumference of which the Muſcles *Obturator Internus*, and *Externus*, ariſe; and at its lower end it has a large Protuberance, upon which we ſit, and from whence the Benders of the Legs ariſe; and a little above this, upon its hinder Part, it has another ſmall acute Proceſs, betwixt which, and the former Protuberance, lies the Sinus of the *Iſchium,* through which the Tendon of the *Obturator Internus* paſſes. Theſe Bones are more ample and large in Women than Men.

THERE remains only now, that we proceed to an Examination of the *Bones* belonging to the Limbs, which we ſhall diſtinguiſh into the Arms and Legs. And firſt of the Arm, which is well worth our Obſervation and Conſideration, in relation as 'tis an Organ, and Inſtrument given by Nature, not only to defend our ſelves, but as an Executor of our Will, and which gives us a Sovereign Power and Command over all Creatures.

THE Arm I ſhall divide into the *Scapula*; the *Humerus*, or Shoulder Bone; the *Cubitus*, or Cubit; and the Hand, properly ſo call'd.

THE *Scapulæ*, or *Shoulder Blades*, are two large and broad *Bones*, ſituated on the back-part of the *Thorax*; being only faſten'd with Muſcles, except in its *Acromion*; and form the breadth of the Shoulders: They are of a triangular Figure; its outſide is ſomewhat Convex, and its inſide Concave: It has three Proceſſes, the firſt runs along the middle of its outſide, extending all its length, and is call'd the Spine. The Extremity of this Spine, that is articulated with the Extremity of the *Clavicula*, is call'd the *Acromion.* The ſecond Proceſs is a little lower than the *Acromion*, and is call'd *Coracoides*; it reſembles a Crow's Bill; it ſtrengthens the Articulation of the *Humerus*. The third is a ſhort Proceſs, which receives the Head of the Arm Bone; the *Sinus* receiving this Head is ſomewhat flat, and its Edges tip'd with a Cartilaginous Ligament, which prevents the *Humerus* from being too eaſily diſlocated: This Proceſs is call'd *Proceſſus brevis*; its upper Edge is call'd *Coſta ſuperior*, and its lower *Coſta inferior*; its broad end its Baſis. The *Scapula* gives Origine to many Muſcles, faſtens the Arm to the Body, and ſerves to ſupport it, that it may have all it Motions.

THE *Os Humeri*, or Shoulder Bone, is ſituated betwixt the *Scapula* and *Cubitus*, wherewith it is conjoyn'd both above and below; it is the ſtrongeſt and largeſt of all that compoſe the Arm; it is long, and almoſt round, yet a little Convex on the outſide, and Concave on the inſide; its principal Part is of a very ſolid and compact Subſtance, and has a pretty wide and long Cavity in its middle, partly to contain the Marrow, and partly to make it leſs ponderous: It is thickeſt at both its Extremities, which are more porous and ſpongious.

AT its upper end it has a large round Head, inveſted with a very thick, pliable, and ſlippery Cartilage, which is receiv'd into the *Sinus* of the Neck of the *Scapula*, and deſign'd for all the various Motions of the Arm; forward, backward, to the right, to the left, upward and downward; for it is articulated by *Arthrodia*, or Ball and Socket, as Tradeſmen call it, which is the moſt perfect kind of Articulation, and adapted for all manner of Motion. That part of the *Humerus* immediately under its Head, is call'd the Neck, which is a very ſhort *Epiphyſis*, for the Inſertion of the Ligament. Upon the fore-part of the Head there is a Channel, or Trench, through which paſſes a Tendon of the *Muſculus Biceps*.

THE *Sinus*, or Cavity, that receives this Head, ſeems not to have a ſufficient depth for it, which would have prov'd an Impediment to the various and ready Motions of the Arm: Provident Nature therefore, to prevent a Diſlocation in this Part, has provided againſt this Inconveniency by ſtrong Ligaments, and peculiar Form to this Head; and more particularly, by adjoyning another Cartilage to that which inveſts the *Sinus*, and forms a ſort of Bag round the Head of the *Humerus*; but being faſten'd to it by Ligaments, begins with a thick Edge, but grows thinner by degrees, as it approaches towards the Centre. This Articulation of the *Humerus* within the Cavity of the *Scapula*, is very peculiar, and varies much from all others; for in the others, the Head of the Bone is receiv'd, and roll'd within a bony Cavity; but this Cavity of the *Scapula* ſerves only for a Support, or Prop to the Head of the *Humerus*, which is inclos'd within a membranous Caſe.

THE lower end of the *Humerus*, which is thinner and broader than the other, has two Protuberancies. Its interior and inferior Head is articulated with the *Cubitus*, or *Ulna*, by *Ginglymus*, and is by ſome call'd the *Trochlæa*, from its reſemblance to a Pully; and its external Head is joyn'd to the *Radius* by *Arthrodia*, and inveſted with a Cartilage. On both ſides of theſe Heads are certain Prominencies call'd Tubercles, deſign'd for the Origination of ſeveral Muſcles. On the fore-part of the Protuberancies there is a ſmall *Sinus*, which receives the anterior Proceſs of the *Ulna*, and on the back-part there is another large *Sinus*, which receives the *Olecranum*.

THE *Cubitus*, or Cubit, which is the ſecond Part of the Arm, conſiſts of two Bones; the leaſt of which is call'd the *Radius*, and plac'd on the outſide; and the other is call'd the *Ulna*, and is on the inſide of the Fore-Arm. The *Ulna* performs the Office of Flexion and Extenſion; and the *Radius* turns on the *Ulna* as on an *Axis*; the *Ulna* at that Time remaining unmov'd, and produces that Motion of the Hand, upwards and downwards, call'd *Pronation* and *Supination*. *Pronation* is perform'd, when the Palm of the

Hand is turn'd down, and the Back is uppermoſt; and, on the contrary, when the Back of the Hand is undermoſt it's call'd *Supination.*

THE *Ulna* is a long and hard Bone, with a Cavity in the middle, and reaches from the Elbow to the Wriſt. It is big at its upper end, and grows ſmaller to its lower end; at its upper end it has two Proceſſes, which are receiv'd into the fore and hind *Sinus* of the lower Extremity of the *Humerus.* The foremoſt Proceſs is ſmall and ſhort; the hindmoſt is bigger and longer, and terminates like a Beak, and is call'd the *Olecranum*; it prevents the Arm from falling too far outwards, beyond its ſtrait Line, when extended at its full length. Betwixt theſe Proceſſes it has a ſemicircular *Sinus*, which receives the inner Proceſs of the lower end of the *Humerus*, upon which we bend, and extend, our Fore-Arm; and along the middle of that there runs a ſmall Ridge, by which this Bone is articulated to the *Humerus* by *Ginglymus*; had the Articulation here been an *Arthrodia*, the Joint would have been much weaker, and the Hand could have receiv'd no more Motion from it, than it already has from the Shoulder.

THE Inſide of this ſuperior Extremity has a ſmall *Sinus*, which receives the Circumference of the round Head of the *Radius.* Its lower Extremity, which is round and ſmall, and of a ſmooth Surface, is receiv'd into a *Sinus* in the lower end of the *Radius* laterally, and upon this Extremity it has a ſhort and ſmall, and acute Proceſs, call'd *Styloides*, from which the Ligaments, which tie it to the Bones of the Wriſt, ariſe: This Proceſs ſerves to keep the Bones of the Wriſt in their Place.

In the upper end of the *Radius* (which accompanies the *Ulna* from the Elbow to the Wriſt) is a ſmall, flat, ſuperficial concave *Sinus*, which receives the convext Tubercle of the inferior Appendix, or lower Proceſs, of the *Humerus*. The whole Circumference of this Cavity is very round and ſmooth, and rowls in the ſmall *Sinus* in the upper end of the *Ulna*. Near its lower end, which is bigger than its upper, it has a little *Sinus*, which receives the inferior end of the *Ulna*; and in its Extremity it has two Cavities, which receive two Bones of the *Carpus*, or *Wriſt*. Altho' the *Radius* and *Ulna* accompany one another, yet do they not touch, but at their Extremities; they bend from one another in the middle, but they are tied together by a ſtrong and broad membranous Ligament.

The third Part of the Hand is divided into three Parts, the *Carpus*, or *Wriſt*; the *Metacarpus*; and *Fingers*.

The *Carpus*, or *Wriſt*, conſiſts of eight Bones, of different Figure and Bigneſs, diſpos'd into two Ranks, four in each Rank; the firſt Rank is articulated with the *Radius*;

and the ſecond with the Bones of the *Metacarpus*; the laſt little Bone of the firſt Rank lies not at the ſide of the third, which anſwers to the Bone of the *Metacarpus* of the little Finger, as all the reſt do, by one another, but it lies upon it: They are ſtrongly tied together by the Ligaments which come from the *Radius*, and by the annulary Ligament through which the Tendons, which move the Fingers, paſs.

THE *Metacarpus* conſiſts of four Bones, which anſwer the four Fingers; they are hard, ſolid, round, and long; a little convex and round towards the top of the Hand, and concave and plain towards the Palm: The Motion of theſe are very obſcure, and I ſhall not therefore trouble you with them any longer, but proceed to the Fingers, which conſiſt (together with the Thumb) of fifteen Bones in each Hand, three to each Finger, each of which is call'd a *Phalanx*, or Rank, for which Reaſon they are pliable, and adapted for different Motions. At the upper Part of each Bone, in the firſt *Phalanx*, is a Cavity, into which the Head of each of the Bones of the *Metacarpus* is articulated by *Arthrodia*, which is the Reaſon that the Finger is moveable on all ſides. The ſecond and third *Phalanx* are articulated both above and below by *Ginglymus*, whence 'tis they have no other Motions, excepting thoſe of Extenſion and Flexion.

We ſhall divide the Leg, as we did the Arm, into three Parts (*viz.*) the *Femur*, or *Thigh-Bone*; the *Tibia*, or *Leg*, or *Shank*; and the *Foot*, properly ſo call'd.

The *Os Femoris*, or *Thigh-Bone*, is ſingle, and the longeſt and largeſt of all the Bones of the Body; it is ſolid and ſtrong, and its Fibres cloſe and hard; its Figure is oblong, but ſo as to be convex before, and ſomewhat concave behind; it has a Cavity in its middle, to prevent its being too ponderous, and to adapt it for the Marrow: It has alſo a long and ſmall Ridge, call'd *Linea Aſpera*, on its back-ſide, which runs from the uppermoſt, to the lowermoſt part; at its upper end it has three *Epiphyſes*, the firſt is its Extremity, or upper Appendix of the *Thigh-Bone*, call'd its Head, which is large and round, and cover'd with a Cartilage, which is receiv'd in the *Acetabulum Coxendicis*, wherein it is tied by two Ligaments, one pretty large, and comes from the Edge of the *Acetabulum*; the other round and ſhort, and inſerted in the middle of the round Head. This Articulation of the *Thigh-Bone* with the *Hip-Bone* is by *Enarthroſis* or *Arthrodia*. The Part immediately below the round Head is the *Cervix*, or Neck of the *Os Femoris*; it is ſmall, long, and a little oblique, and to which the *Ligamentum Latum* is faſten'd: It makes an Angle with the Body of the Bone, by which means the Thighs and Feet are kept at a diſtance from one another, and we ſtand firmer. The *Linea Propenſionis*, or Line of Propenſion, eaſily falling Perpendicular upon any part of the Quadrangular Space between the Feet: But of that hereafter. Beſides, this Obliquity of the Neck of the Bone, conduces much to the Strength of the Muſcles of the Thigh, which muſt otherwiſe have paſs'd very near the Center of Motion.

The ſecond is call'd *Trochanter Major*, and is a pretty big Protuberance, or Appendix, on the external ſide of the Thigh-Bone, juſt at the Root of the Neck; it is rough, becauſe of the Inſertion of ſome Muſcles into it: It has a ſmall Dent at its Root, into which the *Muſculi Quadragemini*, and the *Obturatores*, are inſerted.

The third is call'd *Trochanter Minor*, and is on the hind-ſide of the *Os Femoris*, a little lower, and leſs than the other. Theſe Protuberancies encreaſe very much the Force of the Muſcles, by removing not only their Inſertions, but likewiſe their Directions from the Center of Motion.

The inferior Appendix of the *Os Femoris*, divided in the middle by a *Sinus* framing two Heads, is articulated with the upper *Sinus* of *Tibia* by *Ginglymus*. Thro' the Space between the hind-part of theſe two Heads, paſs the great Veſſels and Nerves which go to the Leg, becauſe the upper end of the Thigh-Bone was articulated by an *Arthrodia*, that we might not only move our Legs backward or forward, but likewiſe nearer to, and farther from one another; therefore its lower Extremity was joyn'd to the *Tibia* by *Ginglymus*, which is the ſtrongeſt Articulation.

In the Knee there is a little round, and broadiſh Bone, about the breadth of two Inches, ſmooth on the out-ſide, and full of Holes, and ſomewhat convex, and inveſted with a Cartilage on the inſide, and is call'd the *Rotula*, or Knee-Pan.

The Uſe of the *Patella*, or *Rotula*, is not only ſubſervient in Ambulation, but alſo to prevent the *Thigh-Bone* from thruſting out forwards, eſpecially in walking down any ſteep Place, and from preſſing on the Tendons of the extending Muſcles of the *Tibia*; it alſo defends the Articulation of the Thigh and *Tibia*, eſpecially in kneeling; and, like a Pully, acts on the lower part of the *Thigh-Bone*, to extend the *Tibia* when inflected.

The *Tibia* is the ſecond Part of the Leg, placed betwixt the *Knee* and the *Foot*, and conſiſts of two Bones, the inner and biggeſt, is called the *Tibia*, and the outer and leſs, the *Fibula*; they are both of a hard and ſolid Subſtance, excavated within, in the Nature of a Pipe.

The *Tibia* is almoſt Triangular, and has on the fore-part of it a ſharp Edge, called the *Shin*, or *Spina*. In its ſuperior End it has two large *Sinus*'s, tip'd with a ſoft and pliable Cartilage, called *Cartilago Lunata*; it runs in be-

between the Extremities of the two Bones, and becomes very thin at its Edge: It facilitates a ſmall ſide Motion in the Knee. The *Sinus*'s receive the two Protuberancies of the *Thigh-Bone*; by bending our Knee we bring our Leg, in walking, in a ſtrait Line forwards, which, without this Articulation, we could not have done, but like thoſe who have the Misfortune of having a wooden Leg, we muſt in going, even upon a Plain, have brought our Foot about in a Semi-circle, but more evidently ſo, upon an Aſcent.

On the ſide of this upper End it has a ſmall Prominence, which is received into a ſmall Sinus of the *Fibula*; and on its fore-part, a little below the *Rotula*, it has another, to which the great *Tendons* of the Muſcles, extending the Leg, are inſerted: Its lower end is much ſmaller than its upper; it has a remarkable Proceſs, which forms the inner Ankle, and a pretty large *Sinus*, divided in the middle by a ſmall Protuberance; the *Sinus* receives the convex Head of the *Aſtragalus*, and the Protuberance is received into the *Sinus* in the convex Head of the ſame Bone: It has another ſhallow *Sinus* on the ſide of its lower End, which receives the *Fibula*.

The *Fibula*, tho' it be much ſmaller, is yet as long as the *Tibia*, it lies on the outſide the Leg; on its upper End, which is not ſo high as the Knee, has a ſhallow Depreſſure in its inner ſide, which receives the lateral

Knob of the upper End of the Prominence of the *Tibia*; its lower End is received into the ſmall *Sinus* of the *Tibia*, and then it extends into a large Proceſs, which forces the outer Ankle, and embraces the external ſide of the *Aſtragalus*. The *Tibia* and *Fibula* touch only at their Ends; and the Space between them is filled up by a ſtrong membranous Ligament, and ſome Muſcles, which extend the Feet and Toes.

We come now to the Foot it ſelf, theſe, like thoſe of the Hand, are divided into three Parts (*viz.*) the Bones of the *Tarſus*; *Metatarſus*; and thoſe of the Toes: The *Tarſus* is compoſed of ſeven Bones, and is the Space between the Bones of the Leg and the *Metatarſus*. The firſt is called *Aſtragalus*, or *Talus*; it has in its upper Part a convex Head, which is articulate with the two *Fociles* of the Leg by *Ginglymus*, being it is divided by a little *Sinus*, which receives the ſmall Protuberance in the middle of the *Sinus* of the *Tibia*; and without this Articulation, we muſt always, in going, have trod upon our Heel with our Fore-foot, and upon our Toes with the Hind foot. The fore-part of the *Aſtragalus* is Convex alſo, is receiv'd into the *Sinus* of the *Os Naviculare*, below, towards the hind-part of its underſide; it has a pretty large *Sinus*, which receives the upper, and hind-part of the *Os Calcis*; but towards the fore-part of the ſame ſide, it has a Protuberance, which is received into the upper and fore-part of the ſame Bone.

THE ſecond Bone of the *Tarſus* is the *Os Calcis*, or Heel-Bone, articulated to the *Aſtragalus* by *Ginglymus*, before to the *Os Cubi forme*.

THE third is called *Os Naviculare*, joyned to the *Aſtragalus*, and *Oſſa Cunei forma*.

THE fourth, fifth, and ſixth, are called *Oſſa Cunei forma*, becauſe they are large above, and narrow below, they are joyn'd to the *Os Naviculare* at one end, and at the other, to the three inner Bones of the *Metatarſus*.

THE ſeventh is called *Os cubi forme*, becauſe of its Form.

THE *Metatarſus* are five Bones, they ſuſtain the Toes, and are larger than the Bones of the *Metacarpus*; and as to the reſt, are like them, and articulated to the Toes, as they are to the Fingers.

THE Bones of the Toes are fourteen, two the great Toe, the reſt three each; they are like the Bones of the Fingers, only they are ſhorter.

IN the Toes, are found twelve *Oſſa Seſamoidea*.

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OF THE
MUSCLES.

Of the MUSCLES in General.

BEFORE we proceed to a particular Deſcription of the Muſcles, it ſeems very proper that we firſt inform our ſelves of their Structure, and Compoſition in general.

ALL that ſoft Part of the Body, which we commonly call Fleſh, is diſtinguiſh'd by Anatomiſts into various Parts, and Parcels; and to which they give the Name of Muſcles.

A MUSCLE then, is a Bundle of fleſhy and tendinous Fibres incloſ'd in one proper Membrane, call'd *Membrana propria Muſculorum*, which covers immediately all the Fibres of the Muſcle; and is a Web of ſeveral Sorts of Fibres. By Means of theſe Muſcles all the Motions in an animal Body are perform'd; and they are diſtinguiſh'd into three Parts (*viz.*) the Head, the Tail, and the Body, or Belly. The Belly of the Muſcle is the middle Part of it, and is compos'd of fleſhy Fibres, red, lax, and ſpongious, containing many *Veſiculæ*, or ſmall Cells: Theſe Fibres are ty'd together by ſmall ſhort Threads, or little *Fibrillæ*, which go from Fibre to Fibre, and are called Membranous Fibres. The Head and Tail are compos'd of tendinous Fibres, which are white, hard, compact, and cloſely bound together, and are leſs than the Body of the Muſcle; but yet there are as many tendinous Fibres in the Head and Tail, as there are fleſhy ones in the Belly of a Muſcle. Each Muſcle has Arteries, Veins and Nerves; either of which being ty'd, deprives the Muſcle of the Power of contracting; but that Impediment remov'd they contract again.

MUSCLES are either Simple, or Compound; in the firſt all the fleſhy Fibres run parallel to one another, as in the ſame Direction; in the latter they run in ſeveral Planes croſſing one another, or of different Directions; and may be divided into as many ſimple Muſcles as there are Planes, whoſe Fibres have different Directions: Theſe Muſcles reſemble a Lozenge, or *Rhomboides*.

ALL Muſcles which ſerve for the ſame Motion, aſſiſt one another in the Action; and thoſe Muſcles which act oppoſite to them are call'd Antagoniſts; ſo that every bending Muſcle has alſo an extending Muſcle; and when the one contracts, its Antagoniſt extends. That Bone, or Bones, to which the Muſcle is inſerted, is the Part always that moves.

THE Head is lifted up, or pull'd backwards; mov'd ſemicircularly; and bended forwards.

IT is lifted up, or pull'd backwards, by four Pair of Muſcles; the *Splenius*, the *Complexus*, the *Rectus Major*, and the *Rectus Minor*.

THE *Splenius* ſingly, without its Fellow, draws the Head together with the *Vertebræ* of the Neck, to which it is inſerted, to that ſide backwards; if they both act, they pull the Head directly backwards together, with thoſe of the *Vertebræ* of the Neck: This Muſcle ariſes partly tendinous, and partly fleſhy, from the four or five ſuperior Spines of the *Vertebræ* of the Back. The lower Part of this Muſcle is inſerted to the tranſverſe Proceſſes of the third, fourth, and fifth *Vertebræ* of the Neck. The ſuperior Part is inſerted into the upper Part of the *Occiput*.

MR. COWPER obſerves, That Anatomiſts have err'd, in reck'ning the *Splenii* among the proper Muſcles of the Head, and is of Opinion, that they ought to be eſteem'd as common to the Head and Neck, becauſe they are alſo implanted to the tranſverſe Proceſſes of the *Vertebræ* of the Neck *.

THE *Complexus* is a Muſcle alſo, that acting ſingly, draws the Head to the ſame ſide backwards, and both acting, draw it directly backwards.

ITS Origination is from the tranſverſe Proceſſes of the *Vertebræ* of the *Thorax*, and is partly tendinous, and partly fleſhy; it aſcends obliquely, and becomes ſtill more fleſhy, adhering to the Spines of the *Vertebræ* of the Neck, is inſerted into the *Os Occipitis*, immediately under the Termination of the *Splenius*. There is a Part of this Muſcle inſerted into the *Proceſſus Mammi formis*, or the back-part of the Skull.

THE *Rectus Major* ariſes from the double Spine of the ſecond *Vertebra* of the Neck, and is inſerted into the lower part of the *Occiput*.

THE *Rectus Minor* lies under the *Rectus Major*, and is inſerted into the *Os Occipitis*, and has its Origination from the back-part of the firſt *Vertebra* of the Neck. Theſe Muſcles alſo nod the Head backwards.

THE ſemicircular Motion of the Head is perform'd by the *Obliquus Inferior*, *Obliquus Superior*, and *Maſtoidæus*.

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* *Cowper*, Tab. 16.

The *Obliquus Inferior* ariſes from the double ſpinal Proceſs of the ſecond *Vertebra* of the Neck, and after an oblique Aſcent is inſerted into the tranſverſe Proceſs of the firſt.

When either of theſe *Obliqui Inferiores* acts, it draws the tranſverſe Proceſs of the firſt *Vertebra* near the Spine of the ſecond; ſo conſequently the Head is mov'd to the ſame ſide, and is very much aſſiſted on the contrary ſide by the *Maſtoidæus*; and when they both act, they conſpire to hold the Head more ſtable.

The *Obliquus Superior*, ariſes from the tranſverſe Proceſs of the firſt *Vertebra* of the Neck, and is inſerted into the lateral and inferior Part of the *Occiput*.

'Tho' theſe *Obliqui Superiores* perform 'the ſame Office with the *Recti Minores*, of 'pulling the Head directly backwards, when 'it is erect; yet as it is neceſſary the Head 'ſhould be mov'd backward at the ſame Time 'it is turn'd to one ſide; it is an Argument of 'a conſiderable Council of Nature, to add 'theſe, and the *Recti Minores*, to act at that 'Time, ſince the *Recti Majores* are then ſo extended by that Rotation of the Head, that 'they cannot well act *.

The *Maſtoidæus* ariſes partly fleſhy, and partly tendinous, from the upper Part of the *Sternum*, and near half the *Clavicula*, with two, and ſometimes three, diſtinct beginnings; and aſcending obliquely, joyn in half their Progreſs, and compoſe a ſomewhat round, thick, and fleſhy Muſcle; and marching over the upper Part of the Muſcle call'd *Elevator Scapulæ*, becomes broader again, and is inſerted tendinous into the back-part of the *Proceſſus Mammillaris*, and the adjoyning Part of the *Os Occipitis*, above the Inſertion of part of the *Splenius*.

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* *Cowper*, Tab. 17.

'THE Origine, Progreſs, and Inſertion of 'this Muſcle, not being duly conſider'd, has 'led Anatomiſts into Errors concerning its 'Uſe; for if this Muſcle acts on either ſide; 'the Mammillary Proceſs, on the ſame ſide, 'is brought towards a right Poſition with its 'Original at the *Sternum*, and the Head is 'turn'd to the contrary ſide; and this Action 'of it is commonly well expreſs'd by Painters; 'but ſhould it more and more contract, it will 'draw the Head to one ſide forwards, as we 'ſee in wry Necks (commonly ſo call'd) where 'one of theſe Muſcles remains contracted; but 'if they both act together, the Head is rather 'pull'd back than forwards, by how much 'their Inſertions are rather behind the *Mammillary Proceſſes* than upon them; which 'Proceſſes are *è Diametro* oppoſite to the Arti'culation of the Head, with the firſt *Vertebra* 'of the Neck *.

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* *Cowper*, Tab. 18.

THE Head is bended forwards by the *Rectus Internus Major*; and *Rectus Internus Minor.*

THE *Rectus Internus Major* ariſes partly fleſhy, but chiefly tendinous, from the fore-part of the five interior tranſverſe Proceſſes of the *Vertebræ* of the Neck, and is inſerted into the foremoſt *Appendix* of the *Os Occipitis*, near its great Hole, that tranſmits the *Medulla Oblongata.*

THE *Rectus Internus Minor* lies on the fore-part of the firſt *Vertebra* of the Neck, like the *Rectus Minor* on the back-part; and is inſerted into the anterior *Appendix* of the *Os Occipitis*, immediately under the former.

THESE are Antagoniſts to the *Recti Minores.*

FALLOPIUS takes Notice of another Pair of Muſcles call'd *Recti Laterales*, which come from the tranſverſe Proceſſes of the firſt *Vertebra*, and are inſerted near the Mammillary Proceſs, and help to move the Head a little on one ſide.

THE Neck is bended by the *Longus* and the *Scalenus.*

THE *Longus* ariſes partly tendinous, but chiefly fleſhy, from the fore-part of the five upper *Vertebræ* of the Back; and is inſerted into the fore-part of all the *Vertebræ* of the Neck; becauſe theſe *Vertebræ* are more moveable than thoſe of the Back.

It is call'd, for its Uſe, *Flexor Colli*, the Bender of the Neck.

The *Scalenus* ariſes from the firſt and ſecond Ribs, and aſcending, is inſerted into all the tranſverſe Proceſſes of the Neck, except the firſt; for which Reaſon, the Neck being more eaſily mov'd, than the Ribs to which they are faſten'd, theſe Muſcles are juſtly reckoned among the Benders of the Neck.

The Neck is extended by the *Muſculi Vertebreles*, and is pull'd directly backwards by the *Spinalis Colli.*

The *Spinalis Colli* ariſes fleſhy from the five ſuperior tranſverſe Proceſſes of the *Vertebræ* of the Back, and inferior of the Neck; and aſcending obliquely, is inſerted into the inferior Margin of the back-part of the ſecond *Vertebra* of the Neck: This, with its Fellow, pull the Neck directly backwards.

The Body is kept erect by

The *Longiſſimus Dorſi*; this Muſcle is an inſeparable Companion, at its Origination, with the *Sacrolumbus*, which ariſes from the back-part of the Spine of the *Os Ilium*; the upper part of the *Os Sacrum*; and all the Spines of the *Vertebræ* of the Loins: In its Aſcent it gives divers tendinous Inſertions to the tranſverſe Proceſſes of the ſame *Vertebræ*; as alſo to thoſe of the Back and Neck. This Muſcle is not only imploy'd in keeping the Body erect, and bending it backwards, but it is a conſiderable Help in walking; for when either Leg moves forwards, this Muſcle, on the ſame ſide, may be obſerv'd to be in Action near its Riſe. Under this Muſcle lies

THE *Tranſverſalis Dorſi*, of which Anatomiſts commonly make three *Muſcles* (viz.) the *Sacer*, the *Semiſpinctus*, and *Tranſverſalis Colli*. It ariſes from all the tranſverſe Proceſſes of the *Vertebræ* of the Loins, Back, and Neck; except the two firſt; and alſo from the *Os Sacrum*; and aſcending obliquely, is inſerted by ſo many diſtinct Tendons to the Spines of the ſuperior *Vertebræ*. This Muſcle moves the whole Spine obliquely backwards.

THE *Inter Spinales* ariſe partly fleſhy, and partly tendinous, from the Spines of the Loins; and the Inferior of the Back; and are inſerted into the fifth, ſixth, and ſeventh Spines of the Back: They joyn the *Longiſſimus Dorſi*; another Part ariſes [from the ſuperior Parts of each double ſpinal Proceſs of the Neck; except that of the ſecond *Vertebra*. (Mr. COWPER, who firſt obſerved theſe Muſcles, takes Notice, That it was for theſe Muſcles that the ſpinal Proceſſes of the *Vertebræ* of the Neck were made double) and it is inſerted into the interior Parts of all the ſaid Spines. This Muſcle draws the ſpinal Proceſſes nearer each other, when we pull the Head very much back.

THE *Quadratus Lumborum* ariſes fleſhy from the poſterior Part of the Spine of the *Ilium*; and after an oblique Aſcent, is inſerted into the inſide of all the tranſverſe Proceſſes of the *Vertebræ* of the Loins. This Muſcle moves the Body upon the Loins to one ſide, and moves the *Vertebræ* of the Loins, or *Os Ilium*, nearer each other. So when we ſtand on one Foot, it draws the *Vertebræ* to that ſide, and makes the Trunk come towards a perpendicular Direction of its Gravity to that Foot; ſo as to ſuſtain the Weight of the whole Trunk, and ſuperior Parts thereon. But if we hang by the Hands; then, either of theſe Muſcles acting, draws the *Os Ilium* nearer the *Vertebræ* of the Loins.

THE *Vertebræ* of the Loins are bended by the Muſcles of the lower Belly.

THE Muſcles of the *Thorax*, being for the Uſe of Reſpiration, I ſhall omit, as well as thoſe belonging to the Belly, Privities, *&c.* and ſhall proceed to thoſe belonging to the Shoulder Blades, and then to thoſe of the Limbs.

THE *Scapula* is mov'd backwards; and forwards; upwards; and downwards: It is moved forwards by

THE *Seratus minor Anticus*; is inſerted into the *Proceſſus Coracoides*, which it draws forwards; and ariſes thin and fleſhy from the ſecond, third, fourth, and fifth Ribs.

THE *Trapezius*, or *Cucullaris*, ariſes fleſhy from the *Os Occipitis*, and tendinous from the Points of the Spines of the three loweſt *Vertebræ* of the Neck, and eight ſuperior of the Back; which broad Origination is inſerted into the Spine of the *Scapula*; to the *Acromion*; and *Clavicula.* This Muſcle moves the *Scapula* variouſly upwards, backwards, and downwards; according to the three Directions of its Fibres.

THE *Rhomboides*, ſo call'd from its Figure, ariſes tendinous from the two inferior Spines of the Neck, and four ſuperior of the Back; growing fleſhy in its oblique Deſcent, it is inſerted to the whole Baſis of the *Scapula*, which it draws upwards, and backwards.

THE *Levator Scapulæ* has divers ſeparate Originations from the ſecond, fourth, and fifth, tranſverſe Proceſſes of the *Vertebræ* of the Neck; which after unite and compoſe one large fleſhy Muſcle, which is inſerted into the ſuperior Angle of the *Scapula*, which it draws upwards. This Muſcle is alſo call'd *Muſculus patientia*, becauſe thoſe who are any ways griev'd, uſe it. Theſe Muſcles may move the Arm, as thoſe of the Arm move it, becauſe of the Connexion of the two Bones: They help alſo in Reſpiration.

WE now come to the Limbs themſelves, and firſt of the Arm, which is, ſtrictly ſpeaking, only of that Part between the Shoulder Blade, and the Elbow.

THE *Humerus*, or Arm, has five different Motions; they move upwards; downwards; forwards; backwards; and round.

THERE are three which lift the Arm upwards *(viz.)* the *Deltoides*; the *Supra Spinatus*; and *Coraco brachialis.*

THE *Muſculus Deltoides* is of a triangular Figure, and ariſes from the *Spina Scapulæ*; from the *Acromion*; and from the inferior external half of the *Clavicula*, where it is intirely fleſhy; from hence deſcending, growing ſtill narrower, it paſſes above the Joynt of the *Humerus*, and is inſerted by a ſhort Tendon, partly fleſhy, and partly tendinous, to near the middle of the *Humerus* near its external ſide. This Muſcle does not only lift the Arm directly upwards, but alſo ſomewhat forwards, or backwards, according to the Direction of its different Series of Fibres.

THE *Supra Spinatus* is plac'd above the Spine of the Shoulder Blade, and ariſes fleſhy from all the Baſis of the *Scapula* that's above the Spine; as alſo, from the Spine and ſuperior Side of the Shoulder Blade, and from thence paſſing over the *Acromion*, and Articulation of the *Humerus*, where it becomes tendinous, is inſerted into the Neck of the *Humerus*, which it embraces by its Tendon. This Muſcle alſo moves the Arm a little backwards, as well as lifts it up.

THE *Coraco brachialis*, ariſes partly fleſhy, and partly tendinous, from the extreme Point of the *Proceſſus Coracoides Scapulæ*; in its Deſcent it grows thicker; and is inſerted into the middle, and inner part of the *Humerus.*

THE Arm is drawn downwards by two Pair of Muſcles, call'd the *Latiſſimus Dorſi*, and the *Teres Major*.

THE *Latiſſimus Dorſi*, or *Anis captor*. This Pair of Muſcles covers almoſt all the Back; its Origination is thin, large, and tendinous, and deriv'd from the Spines of the ſeven lower *Vertebræ* of the Back; and from all the Spines of the *Vertebræ* of the Loins; from the ſuperior Spines of the *Os Sacrum*; and alſo from the poſterior Part of the Spine of the *Os Ilium*. In its Aſcent over the Ribs laterally, it has divers *Faſciculi* of fleſhy Fibres, that ariſe from thence, and joyn with it; and as it paſſes by the inferior Angle of the *Scapula*, it becomes thicker, more fleſhy, and narrower, and is inſerted with the *Teres Major*, with a ſhort, flat, ſtrong Tendon, into the *Humerus*. It draws the Arm downwards, and alſo a little backwards.

THE *Teres Major*, or *Rotundus Major*, ariſes from the lower Angle of the *Scapula*; it makes a broad, flat, but ſhort Tendon; and is inſerted with the *Latiſſimus Dorſi*, below the Neck of the *Humerus*. It draws the Arm backwards, and pulls it ſomewhat downwards.

THE Arm is mov'd forwards by the *Pectoralis*; which has a ſemicircular, broad, and fleſhy beginning, from near half the inner part of the *Clavicula*, below from the *Os Pectoris*, and from all the cartilaginous Ends of the ſix ſuperior Ribs; and from the bony part of the ſeventh Rib; and paſſing tranſverſly over the upper part of the *Muſculus Biceps Cubiti*, and above the Termination of the *Deltoides*, it is inſerted by a ſhort and broad, ſtrong Tendon, into the upper and inner part of the *Humerus*.

THE croſſing of the Fibres of this Muſcle, near their Inſertion, is a Contrivance in Nature, to render its Action more vigorous. The Fibres of the upper part deſcend to the lower part of its Implantations to the *Humerus*; and thoſe of its lower part aſcend to the upper, croſſing each other with acute Angles. This Muſcle is call'd alſo *Adductor Humeri*, and moves the Arm variouſly, according to the Operation of its ſeveral Series of Fibres.

THE Arm is drawn backwards by three Muſcles; the *Tranſverſalis*; the *Infra Spinatus*; and *Subſcapularis*.

THE *Tranſverſalis*, or *Teres Minor*, ariſes from the lower Edge of the *Scapula*, and is inſerted into the Neck of the *Humerus*. Mr. COWPER obſerves, That this Muſcle may be wanting in ſome Bodies, and did imagine it to be ſo in a Subject he order'd a Figure to be drawn from.

THE *Infra Spinatus* lies below the Spine of the *Scapula*; and riſes fleſhy from the inferior Part of the Baſis of the *Scapula*; and is inſerted into the upper Part of the Neck of the *Humerus*.

THE *Subſcapularis* fills and covers all the internal concave Part of the *Scapula*; ariſes fleſhy from its whole Baſis, and from its upper and lower *Coſta* internally, and grows leſs in its Progreſs; and paſſing over the Joynt, is inſerted into the Neck of the *Humerus* in a ſemicircular manner. This Muſcle draws the Arm to the Trunk of the Body; and is made uſe of by the Bag-piper, to compreſs his Bellows under his Arm.

THE Tendons of theſe three laſt Muſcles ſurround the Joynt of the *Humerus.*

WHEN all theſe Muſcles move ſucceſſively, the Arm moves circularly.

THE *Cubitus*, which is that Part of the Arm (commonly ſo call'd) from the lower end of the *Humerus*, to the *Carpus*, or Wriſt, is bended and extended by ſix Muſcles: It is bent by the *Biceps*; and *Brachæus Internus*; and it is extended by the *Longus*; *Brevis*; *Brachæus Externus*; and the *Anconæus.*

THE *Biceps* has two Heads, or tendinous Originations; the one ariſes from the upper Part of the brink of the Head of the *Scapula*, under the broad Ligament of the Joynt, and is call'd the external Head, which is round and tendinous, and is incloſ'd in the Channel in the Head of the *Humerus.* The other ariſes from the *Proceſſus Coracoides*, and is call'd the internal Head; it is broad and tendinous; in their Deſcent they joyn; and about the middle, and fore-part of the Arm, they compoſe a large fleſhy Muſcle, which becoming leſs near the Joynt of the Cubit, with the *Humerus*, grows perfectly tendinous, and is inſerted by a ſhort, thick, and round Tendon, into a Protuberance at the upper end of the *Radius*. Some of the Fibres of this Tendon form another thin Tendon, which paſſes over the *Muſculus pronator Radii Rotundus*, and covers all the Muſcles of the *Radius* and Fingers externally. This Muſcle bends the Cubit.

THE *Brachæus Internus* ariſes fleſhy from the middle, and internal Part of the *Humerus*, at the Terminations of the *Deltoides*, and *Coraco Brachialis*; and lies partly under the *Biceps*, and deſcending over the Joynt of the Cubit, with the Arm-Bone, is inſerted, partly fleſhy, and partly tendinous, into the upper and fore-part of the *Cubitus*, by a very ſhort, and ſtrong Tendon. This Muſcle bends the Cubit.

THE *Longus* ariſes from the inferior *Coſta* of the *Scapula*, near its Neck; as it deſcends upon the back-ſide of the *Humerus*, it joyns the *Brevis*, which ariſes from the ſuperior and hinder Part of the *Humerus*; and both together joyn the *Brachæus Externus*, which ariſes from about the middle and hinder Part of the *Humerus*. The fleſhy Fibres of theſe three being ſo joyn'd, and being externally tendinous, they cover the Elbow, and are inſerted into the *Olecranium*.

The *Anconæus* ariſes fleſhy from the inferior and back-part of the *Humerus*; it is a ſmall Muſcle, but grows thicker as it marches between the upper ends of the *Ulna* and *Radius*, and is inſerted into the lateral and internal Part of the *Ulna*, about a Thumb's length below the *Olecranium*.

These Muſcles extend the Cubit.

The *Radius*, or ſecond Bone of the Cubit, is bended, and extended by the Muſcles already deſcrib'd in common with the *Cubitus*, or *Ulna*; yet it has peculiar to it ſelf four Pair of Muſcles; two of which turn the Palm of the Hand downwards, and are call'd *Pronator Teres*; or *Rotundus*; and *Pronator Quadratus*: The two other turn the Palm of the Hand upwards, and are call'd *Supinator Longus*; and *Supinator Brevis*.

The *Pronator Teres* ariſes fleſhy from the internal Protuberance of the *Humerus*; and paſſing obliquely, has a fleſhy, and tendinous Inſertion into the middle of the external Part of the *Radius*.

The *Pronator Quadratus* ariſes broad, membranous, and fleſhy, from the lower, and inner Part of the *Ulna*; and paſſing tranſverſly over the Ligament that joyns the *Radius* to the *Ulna*, is implanted of the ſame breadth, on the external and lower Part of the *Radius*.

The *Supinator Longus* ariſes fleſhy from the external Ridge of the *Humerus*; it lies all along the *Radius*, to whoſe external, and inferior Part, it is implanted by a pretty broad Tendon.

The *Supinator Brevis* ariſes tendinous from the external Protuberance of the *Humerus*; and from the external and upper Part of the *Ulna*; and paſſing round the *Radius*, adhering ſtrictly to the Membrane that involves the Articulation of theſe two Bones, it is inſerted into the upper, and fore-part of the *Radius*; but below the Tendon of the *Biceps*.

The Actions of theſe Muſcles are call'd Pronation, and Supination.

Two Muſcles belong to the Palm of the Hand.

The *Palmaris* ariſes from the internal Extuberance of the *Humerus*; it expands it ſelf into a large *Aponeuroſis* which cleaves to the *Metacarpus*, and compoſes four Caſes for the four Tendons of the Fingers to paſs through.

The *Palmaris Brevis* lies under the former, and ariſes from the Bone of the *Metacarpus* that ſuſtains the little Finger; and is inſerted into the eighth Bone of the *Carpus*. They aſſiſt the Hand in graſping any Thing, and this laſt makes the Palm of the Hand concave.

The Wriſt is compos'd of eight ſmall Bones; and is bended, and extended, by four Pair of Muſcles; two of which are internal, and two external.

THE *Cubitus Internus* ariſes tendinous and fleſhy from the internal Extuberance of the *Humerus*, and from the rough Edge of all the anterior Proceſs of the *Ulna*, upon which it runs all along, firmly adhering to the *Pronator Teres* of the *Radius*; then paſſing under the annular Ligament, it is inſerted by a flat, ſtrong, and ſhort Tendon, into the fourth of the firſt Order of the *Carpus*.

THE *Radiæus Internus* ariſes tendinous, from the ſame internal Extuberance of the *Humerus* as the former; and lying along the *Radius*, is inſerted into the firſt Bone of the *Metacarpus* that ſuſtains the Fore-finger.

THESE two Muſcles bend the Wriſt.

THE *Cubitæus Externus* ariſes from the external Extuberance of the *Humerus*, and paſſing under the annular Ligament, is inſerted into the fourth Bone of the *Metacarpus* that ſuſtains the little Finger.

THE *Radiæus Externus* makes two diſtinct Muſcles; the firſt ariſes broad, thin, and fleſhy, from above the external Protuberance of the *Humerus*; and the ſecond ſprings from the lowermoſt Part of the ſame Protuberance; they both lie on the out-ſide of the *Radius*, and paſſing under the annular Ligament, the one is inſerted into the upper Part of the Bone of the *Metacarpus* that ſuſtains the fore Finger, and the other into that which ſuſtains the middle Finger, both being tendinous. They extend the Wriſt.

THE Fingers are bended, and extended, and drawn to and from the Thumb, by ſeveral Muſcles.

THE Muſcles bending the Fingers, are the *Sublimis*, and *Profundus.*

THE *Sublimis* ariſes from the internal Protuberance of the *Humerus*; and from the ſuperior and anterior Part of the *Radius:* It divides into four Tendons, which paſſing under the annular Ligament, are inſerted into the upper Part of the ſecond Bone of each Finger. This bends the ſecond Joynt of the Fingers. Each of theſe Tendons have a ſlit in the middle, through which paſs the four Tendons of the *Profundus*; which lying under the *Sublimis*, ariſes fleſhy from the upper Part of the *Ulna*, and divides into four Tendons, which paſs firſt under the annular Ligament, and then through the ſlit of the former Tendons, and are inſerted into the three Bones of the Fingers.

THE *Extenſor Digitorum communis* ariſes from the external Protuberance of the *Humerus*; and divides at the *Carpus* into three flat Tendons, which paſſing under the annular Ligament, are inſerted into all the Bones of the fore, middle, and ring Fingers.

THE *Lumbricales* are four ſmall Muſcles riſing from the Tendons of the *Profundus*, and inſerted into the firſt Internodes of each Finger. They aſſiſt in bending the firſt Joynt of the Finger.

THE *Interoſſei*, four of which call'd the Internal, ariſe from the upper Part of the *Metacarpus*, next the *Carpus*, and are inſerted on the internal Sides of the firſt Bones of the Fingers, with the *Lumbricales*: Theſe bring the Fingers to the Thumb. The other four are external, and ariſe from the upper Part of the Bones of the *Metacarpus*, next the *Carpus*; and are inſerted on the external Sides of the firſt Bones of the Fingers; and theſe draw the Fingers from the Thumb.

THE Thumb is bended by two Muſcles, call'd,

THE *Flexores Pollicis*; the firſt ariſes from the internal Extuberance of the *Humerus*, and from the middle and inner Part of the *Radius*; and paſſes under the annular Ligament, and is inſerted into the third Bone of the Thumb. The ſecond ariſes from the *Carpi*, and is inſerted into the ſecond Internode of the Thumb.

THE Thumb is extended by three Muſcles (*viz.*)

THE *Extenſor primi Internodei Pollicis* ariſes from the ſuperior, and external Part of the *Ulna*; and is inſerted near the ſecond Joynt of the Thumb. The *Extenſor ſecundi* ariſes from the ſuperior, and external Part of the *Radius*; and inſerted into the ſecond Bone of the Thumb. The *Extenſor tertii* ariſes from the *Ulna*, a little below the firſt, and is inſerted into the third Bone of the Thumb.

THE *Tenar* forms that Part call'd *Mons Lunæ*, and ariſes from the annular Ligament, and firſt Bone of the *Carpus*; and is inſerted into the external Side of the Thumb, and draws it from the Fingers.

THE *Anti-tenar* ariſes from the Bone of the *Metacarpus* ſuſtaining the fore Finger, and is inſerted into the firſt Bone of the Thumb, and draws it to the Fingers.

THE *Abductor Indici* ariſes from the forepart of the firſt Bone of the Thumb, and is inſerted into the Bones of the fore Finger, and draws the Finger to the Thumb.

THE *Index* has a particular *Extenſor* ariſing from the middle, and external Part of the *Ulna*; and paſſing under the annular Ligament, is inſerted into the third Bone of the Finger.

THE little Finger has two proper Muſcles.

THE *Hypotenar*; which ariſes from the fourth Bone of the ſecond Rank of the Bones of the *Carpus*; and from the annular Ligament, and is inſerted externally into the firſt Bone of the little Finger: This draws it from the other Fingers.

THE *Extenſor* of the little Finger ariſes from the external Protuberance of the *Humerus*, and upper Part of the *Ulna*; and paſſing under the annular Ligament, is inſerted into the third Bone of the little Finger.

THE Thigh, or *Os Femoris*, is bended, and extended; moved outwards; inwards;

obliquely; and circularly; by thirteen Pair of Muſcles: it is bended by the *Pſoas*; *Iliacus*; and *Pectineus*.

The *Pſoas Magnus* ariſes fleſhy from the internal Side of the tranſverſe Proceſſes of the *Vertebræ* of the Loins, within the *Abdomen*; and is inſerted tendinous into the lower Part of the leſſer *Trochanter*.

This bends the Thigh, by bringing it forwards.

The *Iliacus* ariſes fleſhy from all the internal Cavity of the *Os Ilium*; it joyns the former where it begins to become tendinous; and is inſerted with it.

This bends the Thigh, and brings it directly forwards, as in walking.

The *Pectineus* ariſes broad and fleſhy from the external Part of the *Os Pubis*; and is inſerted into the Thigh-Bone, a little below the leſſer *Trochanter*.

This bends the Thigh-Bone, by drawing it upwards.

The Thigh is extended by the *Glutæus Major*; *Medius*; and *Minor*.

The *Glutæus Major* ariſes fleſhy from the *Os Coccygis*; the Spines of the *Os Sacrum*; and the poſterior Part of the Spine of the *Os Ilium*; it has alſo a tendinous beginning, at the external Margin of the Spine of the *Os Ilium*; from whence marching over the external Part of the *Glutæus Medius*, at the great *Trochanter*; it meets with the fleſhy Part of the Muſcle ariſing from the poſterior Part of the Spine of the *Os Ilium*; *Sacrum*; and *Os Coccygis*; and cleaving to a broad Ligament that runs between the *Sacrum*, and Tubercle of the *Os Iſchium*; its fleſhy Fibres deſcending diſgregately, and almoſt ſemicircularly become tendinous, as they approach the great *Trochanter*; where it is united with its before-mention'd tendinous Origination, and deſcending together over the great *Trochanter*, joyn with the Tendon of the *Muſculus Membranoſus*, and is inſerted by a large, thick, ſtrong Tendon, to the *Linea Aſpera*, on the Back of the Thigh-Bone, near four Fingers breadth below the great *Trochanter*.

THIS Muſcle pulls the Thigh directly backwards.

THE *Glutæus Medius* ariſes fleſhy from all the external Part of the Spine of the *Os Ilium*, under the former; and deſcending, becomes thicker and more fleſhy; and is inſerted ſemicircularly by a ſhort ſtrong Tendon to the ſuperior, and external Part of the great *Trochanter*.

THIS Muſcle aſſiſts the former.

THE *Glutæus Minor* ariſes with a ſemicircular, broad beginning, from the lower Part of the external ſide of the *Os Ilium*; from whence its fleſhy Fibres deſcend, and are inſerted partly fleſhy, and partly tendinous, at the ſuperior Part of the great *Trochanter*; this performs the ſame Office with the two former.

THE Thigh is mov'd inwards, or both Thighs brought together by the *Triceps*; which having three Originations, and three Inſertions, may be divided into three Muſcles.

THE firſt ariſes by a ſtrong roundiſh Tendon, from the inferior Part of the *Os Pubis*, next the *Pectineus*; and deſcending obliquely, joyns with the third, and is inſerted above the ſecond, into the *Linea Aſpera* of the Thigh-Bone.

THE ſecond ariſes from the lower Part of the *Os Pubis*, by a broad tendinous, but chiefly fleſhy beginning; and is inſerted about the middle of the *Linea Aſpera* of the Thigh-Bone.

THE third ariſes broad and fleſhy from the inferior Edges, and external Parts of the *Os Iſchium*, and *Os Pubis*; and deſcending obliquely, is inſerted partly tendinous, and partly fleſhy, to the *Linea Aſpera* of the Thigh-Bone. The lower Part of this Head is inſerted a little below the ſecond, to the internal and lower *Apophyſis* of the Thigh-Bone. The Uſe of theſe three Muſcles is various, according to the Diverſity of its beginnings; ſo the laſt deſcrib'd Part of it draws the Thigh-Bone upwards, inwards, and ſomewhat backwards; and the firſt and ſecond beginnings, pull the Thigh more inward, and turn it ſomewhat outwards; as when we put our Legs a-croſs each other.

The Thigh is turn'd outwards by the *Quadragemini*; which are four Pair of Muſcles.

The firſt is call'd *Pyriformis*; by ſome, *Iliacus Externus*; and by others, *Quadregeminus Primus*; it ariſes round and fleſhy from the inferior and lateral Part of the *Os Sacrum*; deſcending from thence obliquely in the great *Sinus* of the *Os Ilium*, above the acute Proceſs of the *Iſchium*; it joyns the *Glutæus Medius* before its Inſertion with the

Second and third, call'd *Gemini*, which two Muſcles are united by a carnous Membrane both above and below; and ariſe from the Protuberance of the *Iſchium*; and are, with the firſt, inſerted in the upper Part of the Dent, at the Root of the great *Trochanter*.

The fourth is the *Quadratus*, which ariſes broad and fleſhy, from the *Epiphyſis* of the *Iſchium*; and paſſes tranſverſly of an equal breadth and thickneſs to its partly fleſhy, and partly tendinous Implantation, at the out-ſide of the great *Trochanter*. Theſe move the Thigh outwards, and ſomewhat upwards.

The Thigh is mov'd circularly, and obliquely, when theſe Muſcles act ſucceſſively; but particularly by the two *Obturatores*.

The *Obturator Internus* ariſes broad and fleſhy, from the internal Circumference of the Hole that is between the *Iſchium*, and *Pubis*; whence paſſing tranſverſly, it is inflected on the *Sinus* of the *Iſchium*; on each ſide of which, namely the acute, and obtuſe Proceſs, ariſes its ſecond fleſhy Body, call'd *Marſupium*, which, covering the original Tendons, deſcends obliquely with them, and are inſerted into the Dent of the great *Trochanter*. Its Tendon lies between the *Gemini*; and by it the Thigh is turn'd outwards.

The *Obturator Externus* ariſes fleſhy from the external Circumference of the ſame Hole, as the former; its Name is derived from its Situation; and from its Uſe it is call'd *Rotator Femoris Extrorſum*; it embraces the Neck of the Thigh-Bone, and paſſing under the *Quadratus*, leſſens it ſelf, and is implanted tendinous to the ſmall Cavity of the great *Trochanter*.

The Leg is bended by four Pair of Muſcles; and extended by four; thoſe that bend the Leg, are, the *Semi-nervoſus*; the *Semi-membranoſus*; the *Biceps Femoris*; and the *Gracilis*.

The *Semi-nervoſus* ariſes fleſhy from the back-part of the Protuberance of the *Iſchium*; and is inſerted, by a flattiſh, round Tendon, into the internal Part of the *Epiphyſis* of the *Tibia*.

This bends the Leg backwards, and brings it a little upwards.

The *Semi-membranoſus* has a tendinous Origine from the Protuberance of the *Iſchium*, and is partly cover'd with the *Semi-nervoſus*, in its proper Situation; it compoſes a broad, flat Tendon, which becomes a round, fleſhy

Belly, on the back-part of the Thigh: About the lower *Epiphyſis* of the Thigh-Bone it is converted to a ſtrong round Tendon; and is inſerted into the upper, and back-part of the *Tibia.*

THIS bends the *Tibia*; and more particularly its lower Tendons; which, as they run in a Channel on the inferior *Epiphyſis* of the Thigh-Bone, as in a Pully, they there direct, and render its Action of bending the Leg more vigorous.

THE *Biceps Femoris*, ſo call'd from its two Heads; one of which ariſes tendinous and fleſhy, in common with the *Semi-nervoſus*, from the Protuberance of the *Iſchium*; the other ariſes from the middle of the *Linea Aſpera* by a fleſhy acute beginning, which, as it deſcends, grows broader, and joyning the other, is inſerted by one Tendon into the upper, and external Part of the *Tibula.*

THIS Muſcle alſo bends the Leg.

THE *Gracilis* ariſes ſomewhat broad, partly tendinous, and partly fleſhy, from the Union of the *Os Pubis*, and *Iſchium*; and in its ſtrait Deſcent, by the in-ſide of the Thigh, it becomes tendinous, and is ſo inſerted into the ſuperior, and internal ſide of the *Tibia.*

IT aſſiſts the Flexors of the *Tibia.*

THE Leg is extended by four Pair of Muſcles, which are, the *Rectus*; the *Vaſtus Externus*; the *Vaſtus Internus*; and *Crureus.*

THE *Rectus* ariſes fleſhy from the Pro-eminence of the lower Part of the Spine of the *Os Ilium*, a little above the *Acetabulum*; and deſcends directly between the two following, the *Vaſtus Externus*; and *Vaſtus Internus*; and over the *Crureus*; and becoming tendinous four Fingers breadth above the *Patella*, or *Knee-Pan*, unites with the Tendons of the two *Vaſti*, and *Crureus*, and is inſerted with them into the *Tibia*.

THE *Vaſtus Externus* ariſes externally tendinous, internally fleſhy, from the lower Part of the great *Trochanter*, and exterior Part of the *Linea Aſpera* of the Thigh-Bone; whence deſcending it becomes intirely tendinous; and joyning the Tendons of the *Rectus*, and *Vaſtus Internus*; is inſerted with them (after joyning with the *Patella*) to the *Tibia*.

THE *Vaſtus Internus* ariſes partly tendinous, and partly fleſhy, at the *Linea Aſpera* of the Thigh-Bone; at the Root of the leſſer *Trochanter*, whence deſcending obliquely, and almoſt ſemicircular, it becomes tendinous, and joyns with the Tendons of the two foregoing Muſcles, and the *Crureus*; and joyning the *Patella*, it is inſerted with them.

THE *Crureus* ariſes fleſhy and large, on the fore-part of the Thigh-Bone, between the greater and leſſer *Trochanter*; it deſcends directly, and becomes intirely tendinous a little below the upper Part of the Tendon of the *Rectus*; it lies cloſe upon the Bone, and joyning with the three foregoing Muſcles, they altogether make one broad Tendon, and fixing to the *Patella*, is afterward implanted on the little Proeminence on the upper, and fore-part of the *Tibia.*

THESE extend the Leg, and theſe extending Muſcles of the *Tibia* are much ſtronger than their Antagoniſts the *Flexors*, as appears by their Magnitude and Conformation.

MR. COWPER obſerves, 'That this is 'not without ſome conſiderable End deſign'd 'by the Author of Nature; for ſhould not 'the Legs (ſays he) be extended with a 'Force ſuperior to the incumbent Weight, 'we ſhould be continually liable to an Inflexi'on at the Knees, through the Preſſure of the 'whole Body; much leſs ſhould we be able to 'tranſlate the Body from one Place to another; 'but the All-wiſe Architect of Human Bodies 'has ſo fram'd theſe Muſcles, as not only to 'make them uſeful in ſupporting the whole 'Body, and rend'ring them effectually ſer'viceable in Walking, Running, and the like: 'But thro' the great Proportion of Strength of 'theſe extending Muſcles of the *Tibia*; they 'are alſo capable (upon Inflexion at the 'Knees) by their ſudden acting, to extend 'the Legs with ſuch a Force, as to remove the 'whole from the Place where it ſtood, as in 'Leaping: In which Action the *Sacrolumba*'*les Longiſſimi Dorſi*, &c. (and the *Gaſteroc*'*nemii* of the Feet do in like manner) concur 'in extending theſe Parts.

THE Leg is mov'd obliquely by three Pair of Muſcles, the *Sartorius*, the *Popliteus*, and the *Membranoſus*.

THE *Sartorius* ariſes ſharp and fleſhy from the inferior Part of the Spine of the *Ilium*, cloſe by the *Muſculus Communis* of the *Membranoſus*; and deſcending obliquely by the inſide of the Thigh, it becomes tendinous, and is inſerted three or four Fingers breadth below the ſuperior Extremity, into the internal ſide of the *Tibia*.

BY this Muſcle the Leg is mov'd up, and ſomewhat forwards and inwards; in which Actions the upper Part of this Muſcle appears through the Skin; and by this Muſcle we throw one Leg and Thigh croſs another, or ſit like Taylors, from whom this Muſcle has deriv'd its Name.

THE *Popliteus* ariſes with a ſhort, ſtrong Tendon, from the external and inferior Protuberance of the Thigh-Bone; which deſcending obliquely over the Joynt, it becomes fleſhy, and expands it ſelf more and more, till it is implanted to the ſuperior, and internal Part of the *Tibia*. This Muſcle not only aſſiſts in bending the Leg; but is ſo ſituated, as to antagonize the *Biceps Femoris*, when the Leg, or Knee, is bended, in turning the Foot and Toes inwards.

THE *Membranoſus*, or *Faſcia lata* (ſo call'd from its membranous Expanſion, comprehending all the Muſcles of the *Tibia*, with part of thoſe of the Thigh ;) ariſes fleſhy and acute, from the fore-part of the Spine of the *Ilium* ; deſcending obliquely, it becomes tendinous four Fingers breadth below the great *Trochanter* ; whence it deſcends directly over the *Vaſtus Externus*, to its proper Termination at the upper Appendix of the *Fibula*. When this Muſcle acts, it draws the Leg a little outwards, and helps in extending the Leg.

THE Foot is bended by the *Tibialis* and *Peronæus Anticus*.

THE *Tibialis Anticus* ariſes fleſhy from the upper and fore-part of the *Tibia*, between its Proeminence, where the great Tendon of all the extending Muſcles of the Leg is inſerted ; and deſcending obliquely over the inferior Part of the *Tibia*, and under the annular Ligament ; it is inſerted by a ſtrong, and ſomewhat round Tendon, into the *Os Cunei forme*, which anſwers to the great Toe.

IT pulls the Foot upwards, and forwards directly.

THE *Peronæus Anticus* is the longeſt Muſcle plac'd on the *Fibula* ; it ariſes externally tendinous, and internally fleſhy, from the upper, and fore-part of the *Fibula* ; and deſcending, it compoſes a ſtrong flat Tendon, which becomes ſomewhat round, as it runs thro' the Channel which is in the external Ankle ; and it joyns the *Peronæus Poſticus* to its Inſertion ; and is it ſelf implanted at the ſuperior, and hinder Part of the *Os Metatarſi* of the great Toe.

THE Foot is extended by four Muſcles; the two *Gaſterocnemii*; the *Soleus*; and the *Plantaris*.

THE two *Gaſterocnemii*, with the *Soleus*, make the Calf of the Leg. One ariſes from the back-part of the internal Protuberance of the Thigh Bone; the other ſprings from the ſame Part of the external Protuberance of the ſame Bone: A little below the Joynt their fleſhy Bellies unite, and make one Tendon with the following, which is inſerted into the *Os Calcis*.

THE *Soleus*, which lies under the former, ariſes partly tendinous, but chiefly fleſhy, from the upper, and back-part of the *Fibula*; and *Tibia*; deſcending it joyns its Tendons with the former, and are inſerted, as before. The Tendon compos'd of theſe three Muſcles is big and ſtrong, and call'd *Tendo Achillis*.

*'WHEN theſe foregoing Muſcles act, the
' Foot is ſaid to be extended, or pull'd back-
' wards, which Motion of it is very neceſſary
' in Walking, Running, Leaping, and ſtand-
' ing on Tip-toe, *&c.* hence it is thoſe that
' walk much have thoſe Muſcles larger than
' others, thro' the frequent Uſe of them, and
' amongſt whom, thoſe that carry heavy Bur-
' thens, and eſpecially Chairmen;' and thoſe who wear Pumps, or low Heel Shoes, have

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* *Cowper*, Tab. 33.

theſe Muſcles not only remarkably larger than others, but the Calf of the Leg is ſunk conſiderably lower.

THE *Plantaris* ariſes fleſhy from the ſuperior back-part of the external Head of the Thigh-Bone; and deſcending obliquely, it compoſes a thin, long, flat Tendon, which marches over the *Os Calcis*, expands it ſelf into a large *Aponeuroſis* on the Sole of the Foot, and has the ſame Uſe, Situation, and Connexion, as that of the Palm of the Hand.

THE Office of this Muſcle is very obſcure.

THE Foot is mov'd ſide-ways by two Pair of Muſcles; the *Tibialis Poſticus*; and the *Peronæus Poſticus*.

THE *Tibialis Poſticus* ariſes partly fleſhy, and partly tendinous, at the ſuperior and back-part of the *Fibula*; and *Tibia*; deſcending it becomes tendinous, and paſſes through the Fiſſure of the inner Ankle; and is inſerted to the *Os Naviculare*.

THIS draws the Foot upwards, and inwards.

THE *Peronæus Poſticus* ariſes acute and fleſhy from the ſuperior, and external Part of the *Fibula*; and deſcending paſſes through the Fiſſure of the external Ankle under the Sole of the Foot; and is inſerted into the *Os Metatarſus* that ſuſtains the little Toe.

THIS pulls the Foot outwards.

THE four leſſer Toes bend, extend, and move ſide-ways.

THEY are bended by two Pair of Muſcles, (*viz.*) the *Perforans*; and *Perforatus*.

THE *Perforans* ariſes from the ſuperior, and back-part of the *Tibia*; and paſſing firſt under the annular Ligament, divides into four Tendons, which paſs through the Holes of the *Perforatus*; and are inſerted into the third Bone of each Toe.

THE *Perforatus* ariſes from the inner, and inferior Part of the *Os Calcis*; and divides into four Tendons; is inſerted into the ſecond Row of each Toe.

THESE Tendons (as was before obſerv'd) being perforated, the Tendons of the *Perforans* paſs thro' them.

THESE Muſcles bend the four leſſer Toes.

THE Toes are extended by the *Longus*; and the *Brevis*.

THE *Longus* ariſes from the upper, and outer Part of the *Tibia*; and from the upper Part of the *Fibula*, and divides into five Tendons; and paſſing under the *Ligamentum Annulare*, are inſerted into the third Bones of the four leſſer Toes, and into the *Os Metatarſi*, that ſuſtains the little Toe.

THE *Brevis* lies under the former, and ariſes from the external, and anterior Part of the *Os Calcis*; and is inſerted by five Tendons, into the ſecond *Phalanx* of all the Toes.

THESE Tendons cut the Tendons of the former at acute Angles.

FROM the four Tendons of the *Perforans* ariſe the *Lumbricales*, which are inſerted into the inſide of the four leſſer Toes.

THE *Interoſſei* are Eight; four *Externi*, or External; and four *Interni*, or Internal; and lie between the Bones of the *Metatarſi*.

THE *Interni*, which draw the Toes to the great Toe, lie towards the Sole of the Foot; and ariſing from the ſuperior Part of the Bones of the *Metatarſi*; are inſerted with the *Lumbricales*, into the inſide of the firſt Bones of the leſſer Toes. The *Externi*, which draw the Toes from the great Toe, lie on the top of the Foot; they riſe from the ſuperior Part of the Bones of the *Metatarſi*, next the *Tarſus*; and are inſerted on the outer ſides of the firſt Bones of the Toes.

THE *Abductor minimi digiti* riſes from the external Part of the *Os Calcis*; and is inſerted into the ſuperior Part of the firſt Bone of the ſame Toe externally.

THE great Toe is bended; extended; and mov'd ſide-ways.

THE *Flexor Pollicis Longus* riſes from the ſuperior, and back-part of the *Fibula*; and paſſing behind the inner Ankle; is inſerted into the laſt Bone of the great Toe.

THE *Flexor Pollicis Brevis* ariſes from the middle *Os Cunei forme*; and is inſerted into the ſecond Joynt of the great Toe.

The *Extenſor Pollicis* ariſes from near the middle of the anterior Part of the *Fibula*; and paſſing under the annular Ligament, is inſerted into the laſt Bone of the great Toe.

The *Tenar*, or *Abducens Pollicis*, ariſes from the *Os Calcis*; and from the largeſt *Cunei forme*; and is inſerted into the external ſide of the *Os Seſamoides.*

It draws the great Toe from the reſt.

The *Anti Tenar*, or *Ad-ductor Pollicis*, ariſes from the inferior Part of the third *Os Cunei forme*; and is inſerted into the inſide of the *Oſſa Seſamoidea.*

It draws the great Toe to the reſt.

The *Tranſverſalis* comes from the Bones of the *Metatarſus*, that ſuſtains the Toe next the little Toe; and is inſerted, croſſing the other Bones into the *Os Seſamoides* of the great Toe.

This brings all the Toes cloſe to one another.

We ſhall conclude with an Obſervation of Mr. *Cowper*'s.

'The *Talus* (ſays he) or Heel, together 'with the Toes, being, as it were, a Leaver 'to the whole Body; ought therefore to be 'attended with Muſcles of great Strength to 'extend them; wherefore we find thoſe 'Muſcles ſo much to exceed their Antagoniſt 'the *Tibialis Anticus*; as well in the advantagious Conſtructure of their differing Series 'of fleſhy Fibres, as their Magnitude, and

‘ Inſertion, at the Extremity of the *Os Calcis*; by which they are not only render’d ſerviceable in Walking, Running, and the like; but do alſo ſupport the *Tibia* in ſtanding; leaſt the Weight of the Body ſhould make them incline forwards at their Articulations with the Bones of the Feet.

OF

PROPORTION.

THOUGH we have given you already a Deſcription of the external Parts of Human Body, yet we believe it to be no leſs neceſſary at this Time, to take another View of the Figure of Human Body, as it relates to the due Proportion of each Part, and the Difference ariſing betwixt them, in Reference to Age, Sex, *&c.*

THE Body, as we obſerv'd before, being a Compoſition of ſeveral Figures of its external Parts, 'tis requiſite we ſhould explain the Proportion of a Human Body, according to the abſolute Rules of Nature; that we may have before us a Standard to meaſure all the reſt, and to determine what Body is to be call'd Tall; what Short; Slender; or Thick; Broad; Strait; Well-proportion'd; or Ill-ſhap'd.

A BODY then in Proportion, according to the *European* Standard, which we ſhall follow (though a Body of 2 or 3 Inches ſhorter, would, perhaps, agree better with the Performer in our Profeſſion) ought to be ſix *Geometrical* Feet in Length; and one Foot and a Third in Thickneſs and Latitude: Not but that Bodies which do not recede far from this Rule, may, notwithſtanding, be included within the Catalogue of well proportion'd Perſons.

THUS (according to this Standard) he muſt be called Tall, who meaſures ſeven Feet, or little leſs in Height, though well-proportion'd as to Shape; and ſo, on the contrary, he is to be call'd a little Man, who meaſures but five Feet, or little more, though in his other Dimenſions proportionate, and his Body well-ſhap'd. Thoſe are called Thick, or Fat Men, who meaſure round the Breaſt, or Belly, above three Feet; for in a well-proportion'd Body, the Thickneſs is juſt half the meaſure of the Length; ſo thoſe who do not come near the half of their Length in Circumference, are call'd Lean.

THESE Rules concerning Magnitude are to ſhew, how it is moſt commonly obſerv'd in Human Body; for after all, there is ſtill a great Inequality among our Bodies, depending on the different Ages, Sex, &c.

AS to Age, it is obvious, that there is a conſiderable Diverſity betwixt the Shape of a

Boy, a young Man, and a Perſon come to full Growth and Maturity. As for Infants, and old Men, I ſhall ſay nothing to them, as not coming under the Rules of this Art.

A BOY, or Child, is little and ſhort; a Youth ſomewhat bigger, or taller; but a young Man arriv'd to his full Growth, or Maturity, is then only proportionable in all his Parts. There is alſo a Difference obſervable in reference to Sexes; for not only the Symmetry or Proportion of the Woman differs from that of a Man; in that the Shoulders are remarkably narrower, and that the Channel, or Collar Bones, and Muſcles in general, do not appear ſo ſtrong in them, as in Men; but alſo, that the Woman in general is not (or rather ought not to be) ſo big as the Man; tho' in other Animals, the Female is generally bigger than the Male.

BEFORE I come to a cloſer Examination of the Parts in particular, I muſt beg leave to ſay a Word or Two of the Skin, as it is the firſt, and outermoſt Covering of the Body, and is call'd the *Cuticula*, or Scarf-skin. If we examine this Skin with a Microſcope, it appears compos'd of ſeveral Lays, or Beds, of exceeding ſmall Scales, ſticking cloſe to the papillary Surface of the Skin; and ſo intangle with each other, that they appear a continued Membrane, when raiſed from the true Skin by Bliſters, upon Burning, or Application of bliſtering Plaiſters.

LEWENHOCK reckons, That in one cuticular Scale there may be five Hundred excretory Channels; and, that a Grain of Sand will cover two Hundred and Fifty Scales; ſo that one Grain of Sand will cover one Hundred twenty five Thouſand Orifices, thro' which we daily expire. The Uſe of this Scarf-skin is to defend the Nerves of the Skin (which are the Origin of the Senſe of Feeling) from the Injuries of rough and hard Bodies, as well as from the Air.

NOW we ſhall conſider the Parts in particular, as to Figure, and Magnitude; and what Proportion they bear to one another; and will begin with the Head.

THE Head ought to be of an oblong, ſpherical Figure, according to its natural Conformation; yet ſomewhat flattiſh on both ſides, near the Temples: Its true Magnitude lengthways, ought to make up the ſixth Part of the whole Body, meaſuring from the lower Extremity of the Chin, to the Crown of the Head.

THE Neck, according to its natural Figure, ought to be round; but it is not every way of the ſame Length; for in its fore-part, from the Chin to the *Jugulum*, it ought to be four Geometrical Inches long; but its hind-part, from the Extremity of the hind-head, to the firſt *Vertebra*, three Inches; on the lateral Parts, or Sides, from the tip of the Ear, to the upper Part of the Shoulder, about ſeven Inches;

Inches: The Breadth, or Diameter of the Neck, is four Inches; its Circumference twelve.

THE *Thorax* is of an oval Figure, being ſtraiter on its upper Part, where it is conjoyn'd with the Neck, and broader in its inferior Part, where it is adjoyning to the lowermoſt *Venter*. On the Breaſt before, and on the Back behind, it is ſomewhat flatter. Its natural Proportion is thus computed: The Breaſt, or Cheſt, which begins at the *Jugulum*, or Cavity of the Neck, and terminates at the *Cartilago Enſiformis*, is call'd the ***Sternum***, and contains eight Inches. The Back, from the firſt *Vertebra* of the *Thorax*, to the Extremity of the Twelfth, or beginning of the Loins, a Foot and an Inch; ſo that the Breaſt is five Inches ſhorter than the Back. The Sides are meaſur'd from the *Claviculæ* to the Extremity of the *Thorax*, where the ſpurious Ribs end, nine Inches and an half. The *Thorax* is contracted about the Breadth of an Inch in Expiration, and is dilated two in Inſpiration. This is the natural Proportion of the *Thorax*, which is nevertheleſs ſubject to various Alterations, either by Nature, or internal Cauſes; or elſe by Art, or external Injuries.

THE Breaſts are different, according to the Sex. In Men they do not riſe very high; but in Women they ſwell to a roundiſh Figure. In Virgins of eleven or twelve there is ſcarce any Thing appears, except the Nipples;

but they increaſe as they advance in Years.

THE *Venter*, or Belly, in its natural Proportion, ought to have the Navel for its Center; its Diameter, from the Navel to the Back, about nine or ten Inches.

THE Hands and Feet bear ſo near a Proportion to one another, that thoſe who have long Legs, have alſo long Arms, in a well-proportion'd Body: The whole Leg, in ſuch a Body, will contain about three Feet, if the Body be ſix Feet in length. The Hands and Feet then being of an equal length, meaſure thus: The Length, from the *Os Pubis* to the Heel, will be the ſame with that which is taken from the Arm-pit to the Extremity of the middle Finger.

MR. DU FRESNOY, in his Obſervations on the Art of Painting, where he ſpeaks of the Juſtneſs of Proportion, and of the Harmony they make with one another, gives us the following Meaſures of a Human Body.

'THE Antients (ſays he) have commonly 'allow'd eight Heads to their Figures, though 'ſome of them have but ſeven. But we ordi'narily divide the Figures into ten Faces (that 'is to ſay) from the Crown of the Head to the 'Sole of the Foot, in the following Manner.

'FROM the Crown of the Head to the 'Fore-head, is the third Part of a Face.

'THE Face begins at the Root of the 'loweſt Hairs which are upon the Fore-head,

‘ and ends at the bottom of the Chin.

‘ THE Face is divided into three proportionable Parts; the firſt contains the Forehead; the ſecond the Noſe; and the third ‘ the Mouth and the Chin.

‘ FROM the Chin to the Pit betwixt the ‘ Collar Bones, are two Lengths of a Noſe.

‘ FROM the Pit betwixt the Collar Bones, ‘ to the bottom of the Breaſt, one Face.

‘ FROM the bottom of the Breaſt to the ‘ Navel, one Face.

‘ FROM the Navel to the Genitories, one ‘ Face.

‘ FROM the Genitories to the upper Part ‘ of the Knee, two Faces.

‘ THE Knee contains half a Face.

‘ FROM the lower Part of the Knee to the ‘ Ankle, two Faces.

‘ FROM the Ankle to the Sole of the Foot, ‘ half a Face.

‘ A MAN, when his Arms are ſtretch’d ‘ out, is from the longeſt Finger of his right ‘ Hand, to the longeſt of his left, as Broad as ‘ he is long.

‘ FROM one ſide of the Breaſts to the ‘ other, two Faces.

‘ THE *Humerus*, or Arm-Bone, is the ‘ Length of two Faces, from the Shoulder to ‘ the Elbow.

‘ FROM the end of the Elbow to the Root ‘ of the little Finger (*viz.*) the *Cubitus*, *Carpus*, and *Metacarpus*, contain two Faces.

'FROM the Socket of the Shoulder Blade, to the Pit betwixt the Collar Bones, one Face.

'IF you would be ſatisfied in the Meaſures of Breadth, from the Extremity of one Finger to the other, ſo that this Breadth ſhould be equal to the Length of the Body, you muſt obſerve, That the Articulations of the *Cubitus* and the *Humerus*, and of the *Humerus* and *Scapula*, bear the Proportion of half a Face when the Arms are ſtretch'd out.

'THE Sole of the Foot is the ſixth Part of the Figure.

'THE Hand is the Length of a Face.

'THE Thumb contains a Noſe.

'THE inſide of the Arm, from the Place where the Muſcle diſappears, which makes the Breaſt (call'd the *pectoral* Muſcle) to the middle of the Arm, four Noſes.

'FROM the middle of the Arm to the beginning of the Hand, five Noſes.

'THE longeſt Toe is a Noſe long.

'THE two utmoſt Parts of the Teats, and the Pit betwixt the Collar Bones of a Woman, an equilateral Triangle.

* * *

OF

Defects; Ill Habits, &c.

FROM the Symmetry, and Harmony of all the Parts of a Body, of a regular Proportion, *Beauty* ariſes.

FROM a juſt Poſition, Diſpoſition, and Contraſt of ſuch proportionate Parts, *Grace* ariſes.

THERE is a great Difference betwixt Beauty, and Grace; for a Body may be regular, and beautiful in all its Parts, and yet not agreeable to the Eye; for Beauty (as *Galen* ſays) is nothing elſe but a juſt Accord, and mutual Harmony of the Members, animated by a healthful Conſtitution. How much then ought the Art of Dancing to be valu'd, which, by a juſt Diſpoſition, and by an harmonious Motion of all the Parts, adds Gracefulneſs to this juſt Accord, or Symmetry of the

Members; and, at the ſame Time, by the Exerciſe ariſing from it, contributes ſo much to the preſerving of Health? For from a true Knowledge of our Art, Rules are aſcribed for a right Placing, and Situation of the Head; for the Flexion, and Extenſion, or Turn of the Neck; by which an Air imparts it ſelf throughout; and adds to the Beauty of the Face. A regular and natural Carriage of the Body; a juſt Poſition of the Feet in Standing; with an unconſtrain'd, contraſted Motion in Walking, gives Gracefulneſs to the Shape: Rules for which will be endeavour'd to be laid down in the following Lecture.

AS we have conſider'd the Body in its due Proportion, Beauty, and Grace, it may not be leſs agreeable to us, to ſet it in a contrary View, and make ſome few Obſervations upon it in Relation to its Defects; and endeavour to offer ſome Rules, and Remedies for the Prevention, or Correcting of them.

THE Defects which happen to the Human Body, through the Miſ-formation of the Parts, are many, and of various Kinds, which are either natural; or contracted by ill Habits; of the firſt Sort, are Crookedneſs in the Spine, or Back; Luxations of Hip, Knee, or Ankle; and Inverſion of the Toes, even ſo far as they ſhall be turn'd almoſt in the Place, or natural Poſition of the Heel; and theſe are very difficult to correct; and much more to cure; though it hath been my Happineſs to be acquainted with two ingenious Artiſts; Mr. *Preſgrave* *, and Mr. *Johnſon* †, who do, and have done Wonders this Way; the former by his excellent Bandage; and the latter by his artful Inſtruments; and both by long Experience, and skillful Hands.

ANOTHER Defect in Nature, which I cannot omit, is a Diſtortion of the *Vertebræ* of the Neck, and which is call'd a wry Neck; but this often happens to Infants, through a Neglect, or Ignorance of the Nurſes; by which Means the *Muſcles* moving the Head and Neck, are either too tightly contracted, or too much relax'd, whence they become wry neck'd; and a ſmall matter of either of theſe, by a long ill Habit, gives to Children a Stiffneſs in that Part, which is ſeldom or never corrected, except begun withal very young, which ſhould be a great Inducement to Parents, to let their Children learn this Art of Dancing betimes, in order to correct and cure all ill Habits, that may become irremediable in length of Time; for 'tis certain, that the more firm Parts, in Infancy are flexible, and capable of being moulded into any Form.

THERE are ſeveral other ill Habits of the Body which are much more eaſy to correct: as the twiſting of the Ankles; which if there be no Diſlocation, is reliev'd by good ſtrengthening, or diſcutient Plaiſters. The turning in the Toes, we find by our own Experience, not only help'd, but intirely corrected by Poſition, and Practice. That Miſformation of knocking the Knees together, through a Weakneſs in the Tendons, is often cur'd in Youth by Exerciſe; and eſpecially, if aſſiſted by proper external Application; but in Adults this Defect is ſeldom or never to be redreſs'd.

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* *In* Charles Street, Weſtminſter. † *In* Little Britain.

MOREOVER, I beg leave to obſerve, in relation to ill Habits; that Negligence; and the Cuſtom of our Country, often occaſions, not only Deformity, but even Death it ſelf; and theſe proceed from the manner of Swathing our Infants; which, except a particular and tender Care be taken, ſuch Swathing preſſes and draws in the *Sternum*, and Ribs, and ſo confines the Breaſt, as to produce in Infancy, Conſumptions, and Shortneſs of Breathing; and in riper Years, *Aſthma*'s, *Phthyſicks*, and *Cathars*, &c. Nor do theſe Nurſes take that due Care of the turning of the Limbs, which generally occaſion that ill Poſition of the Knees and Feet; tho' theſe (as I have obſerv'd before) are eaſily rectify'd by us in our Profeſſion, provided they be taken while the Subject is young.

OTHER ill Habits are contracted, either by working in Imbroidery, or ſuch like Works as are done in Tents; and generally practis'd in our Boarding-Schools; this often occaſions Wryneſs, if not prevented by a careful Inſtruction of the Scholar to work alike with both Hands; ſo that one Hand may be ſometimes above the Work, and ſometimes the ſame Hand below the Work. I would alſo recommend to all who have Youth under their Care, to take particular Care, that the Body do not lean, or incline to one ſide more than the other, but that it be upright, and even; and reſted alternately on the Feet; that the Carriage, or Motion, of the Arms and Hands, be without Conſtraint; and this will not only prevent Wryneſs of the Body, but give a Freeneſs to the Limbs, which will add conſiderably to the Beauty and Grace of every Action; and by this Means the Addreſs of ſuch Perſons will always be agreeable and eaſy.

BUT when ſuch Wryneſs of the Neck, or Body is contracted by ſuch, or any other ill Habits, it behoves the Maſter, firſt to endeavour to find out the Occaſion of ſuch Defect; how long contracted; and what Part affected; and then let him proceed to the Remedy; in doing of which, let him not be too haſty, nor wanting in Diligence, and conſtant Application.

AS ſome Defects ariſe from the Bone, which are either natural, as Bandy Legs, *&c.* or accidental, as from the ill Setting of a broken Bone, and the like; and other Defects, are caus'd by a too great Contraction, or Relaxation of the Muſcles, or Ligaments: It is, without Diſpute, of great Conſequence to us (who are Maſters in the Art of *Dancing*) to inſtruct our ſelves in ſome little Knowledge of Anatomy, whereby, at leaſt, by knowing the Cauſe of ſuch Defects, we may be able to judge whether they be curable or not; for, if uncurable, we ſhall ſpare our ſelves a great deal of unneceſſary Trouble, and turn our Endeavours to cover ſuch Defects, by an artful Diſpoſition of the other Parts oppoſite, or antagoniſt, to them: But if remediable, ſuch Knowledge will not a little contribute towards removing ſuch Defects.

There ſtill remain ſome other Defects, though of a leſſer Degree, and which I ſhall only mention to you, and theſe come directly under our Care, and are obvious to the meaneſt of our Profeſſion (though by them very ſeldom rectify'd): Such are the Holding down the Head; Putting out the Chin; Stooping in the Shoulders; Bending too much forwards; and, Thruſting out the Belly: Yet, I muſt take the Liberty to obſerve, That tho' ſuch Defects are eaſily remov'd, by the Care of the Maſter, in young Scholars; yet in Adults, where ſuch Habits have been long contracted and confirm'd, they require the utmoſt Skill, and Care of the Maſter, to correct.

I Cannot quit this Subject without reminding you, That a Head juſtly plac'd; a gentle and eaſy Carriage of the Body; and a true Poſition of the Limbs; as it ſhould be our firſt, ſo, it ought to be our greateſt Care; ſince *theſe* be, what are always expected from us; and not without Reaſon; for without *theſe*, the performing Part of our Art will have no effect on the Spectator; nor, indeed, will ſuch Performance merit the Name of Dancing.

ON

STANDING.

HAVING in a former Lecture fully treated of the Structure, and Actions of the Muſcles; we ſhall now inform our ſelves of the Operations they have on the Body, and Parts thereof; the various Motions of the Joynts, and thoſe that proceed from them; by which we ſhall be able to find the mechanical Reaſons by which ſuch Operations are performed: And we will begin with *Standing*, or *Poſition*; a Speculation which will not only be uſeful and entertaining to us; but abſolutely neceſſary for all who profeſs themſelves Maſters of the Art of *Dancing*; becauſe the Motions in *Walking*, and moſt, or all, Steps in *Dancing*, are perform'd in *Poſitions*; nor can we well comprehend Motion in Going or *Dancing*, without a perfect Knowledge of *Poſition*, or Station.

IT will be requiſite, for the better illuſtrating what we have to ſay on this Subject, to premiſe ſome few Explications of certain Terms in the firſt Principles of Mechanicks.

THE *Center* of heavy Bodies, or *Center* of Magnitude, is a certain Point in the middle of that Body, equally diſtant from its Extremities as much as poſſible, and to which all its Parts tend.

THE *Center of Gravity* is a certain Point in every ſolid Body tending to one common *Center*, through which any *Plane* being drawn, the Body will be always divided into two Parts of equal Weight, and ballanced in ſuch a manner, as that the Parts on one ſide have neither more nor leſs Force than the Parts of the other ſide; but all the Parts remain in *Æquilibrio*.

EVERY Line drawn through ſuch *Center* is the *Diameter*, or the Line of *Gravitation*, *Propenſion*, *Direction*, or *Innixion*.

A SOLID Body will remain fix'd, if the Line of *Innixion* fall from the *Center of Gravity* perpendicular to the Horizon, within the Baſis of ſuch Body; but if ſuch Line fall without the Baſis of ſuch Body, that Body muſt fall; but yet that Body may be prevented from falling, by adding another Body to it, or by tranſlating the Line of *Propenſion*; as by the ſtretching out of a Man's Arm, &c.

THE Skeleton, or Machine, of Human Body, as has been already ſhewn, conſiſts of ſeveral bony Columns, or Pillars, joyn'd to each other by round, ſmooth, and ſlippery Articulations; and upon Examination of the proper Station of each Bone, or Column, we ſhall find none of them plac'd in a perpendicular Bearing to each other. Two Thirds of the Head project from its Juncture with the *Vertebræ* of the Neck. The Breaſt and Ribs project from the *Vertebræ* of the Back, and Loins. Nor are the Articulations of the Thigh-Bones perpendicular to the whole *Vertebræ*, but are plac'd before it; for which Reaſon, none of theſe Columns of Bone can be plac'd, erected, or retained, perpendicular, without their being ſupported, and knit together by the *Ligaments*, *Tendons*, and *Muſcles*; for the Baſis, or Extremities of theſe Columns, being, as I obſerv'd before, round, ſmooth, and ſlippery, the *Innixions* terminate, and are in Points, and not in a plain Superficies, as Columns of Stone, ſtanding upright by a firm touching all the Parts of a plain Baſis.

'TIS allowed then, that the Bones of the Human Body ſerve as Pillars, which, by their Subſtance, and erect Poſition, and with the Aſſiſtance of the Muſcles, ſuſtain the Weight of the whole Body. They ſerve as Columns and Leavers at the ſame Time: Columns when we ſtand upright, and when the Bones ſupport the Body; and as *Vectis*, or Leavers, when the Weight of the Body makes them bend.

EUCLID, in the ſixth Book, and thirty third *Propoſition* of his Elements, tells us, That in the ſame or equal Circles, the *Angles*, whether at the Center, or at the *Periphery*, have that Proportion which the *Arches* have on which they inſiſt. And *Prop.* twenty nine, Book the third, If in equal Circles the Angles, whether at the Center, or Circumference, be *equal*, the Arches alſo on which they inſiſt are *equal*; and if the Arches are equal, the Angles alſo will be equal —— Now the greater is the Angle the greater the Arch; and the greater the Arch is, the greater the Circle; and the greater the Circle is, the greater *is the Line of Direction.* Now it is a known Problem, *That Powers are directly proportional to the Fluxions of their Lines of Direction*; whence it would follow, That the Strengths of a Bone are proportional to their Arches; and, that thoſe of the Legs are ſtronger, in Proportion to the Diameter of the circular *Canula*, which, in effect, is Truth; for we find that Weights, laid upon Bones in order to cruſh 'em, do exactly anſwer the Proportion nam'd; from whence we may admire the wonderful Providence of our Maker, in framing us in ſo mathematical Proportions, as He has done.

THE whole Frame being thus ſupported, and in an erect Poſition perpendicular to the Horizon, and theſe Pillars, or Columns of the Bones of the Legs, Thighs, and *Vertebræ*, ſtanding erect one upon the other, produce the Human Figure ſtanding; provided the Line of *Propenſion* fall perpendicular from the *Center of Gravity* of the whole Body, either between both Feet, or upon one flat Foot, for otherwiſe it could not ſtand erect or upright, but would fall towards thoſe Parts where the Line of *Propenſion* inclin'd. Yet even this erect Poſition, by reaſon of the roundneſs, and ſlipperineſs of the Joynts (as we have before obſerv'd) would be unſtable, were it not for the Aſſiſtance of the Muſcles.

THE *Femur*, or Thigh-Bone, has its End oblique, to enlarge the Baſis between the Legs; for were it not for this bending of the Thigh-Bone, we ſhould with Difficulty preſerve our ſelves from falling on one ſide.

WE very well know how difficult it would be, to erect a Needle upright upon a poliſh'd Plate; and, that the leaſt Motion imaginable would move the Line of *Direction* out of its Place, ſo as to fall beyond the ſmall Baſe of the Needle: But a Pike, or Staff, erected on the Fingers end, might eaſily be kept up, or pois'd, by reaſon of the quick Motion of the Hand following it where-ever it inclines; ſo that the Line of *Direction* may be kept either within the Baſe of the Pike, or Staff; or, when being a little ſwerv'd from it, may be, by that Motion immediately, reduc'd to its Place.

HENCE we may eaſily conceive, That a Man cannot ſtand firm upon the Heel of one

Foot alone; becauſe the Heel being round and globular, will touch the Floor almoſt in a Point, and ſo the Line of *Innixion* will fall from the *Center of Gravity* upon a Point; and it is requiſite for a Man ſtanding upright, that ſuch Line of *Innixion* be perpendicular to the Horizon: But ſuch a perpendicular *Innixion* upon the Point of one Foot alone, ſeems next to impoſſible to preſerve firm and upright; becauſe the Human Machine, and its ſolid and fluid Parts, can never remain quiet, when its breathing, and conflux of Humours, and numberleſs external Cauſes, will ſoon throw it down: Therefore a Man plac'd on either Extremity of one Foot, will always be in a continual State of falling, as if he ſtood upon a ſharp pointed Stone, or on an acute piece of Timber.

NEVERTHELESS a Man may, with ſome little Difficulty, ſtand upon one flat Foot, becauſe the Line of *Propenſion* may be kept within the Compaſs of the Foot, by the various Motions of the Body ariſing from the Force of the Muſcles. But a Man will ſtand firm only when he ſtands upon both Feet; for then a Perpendicular being let fall from the *Center of Gravity*, may move between the two Feet, and in the quadrangular Space determin'd by his two Feet; but ſhould he lean either forwards or backwards, without bending his Body, ſo that the Line of *Propenſion* ſhould fall without the quadrangular Baſe, the

Body would conſequently fall, unleſs by moving either of his Feet he ſuddenly bring it into the Quadrangle again.

BY what therefore has been advanc'd, we learn, That a Man cannot ſtand upon his Heel, or Extremity of his Toe; that he may (though not very eaſily) ſtand upon one flat Foot (*viz.*) when the *Os Calcis*, or Heel, and Ball of the great Toe, or Sole of the Foot, touch the Ground. But to ſtand upright and firm, both Feet are required, the Line of *Innixion* falling either between the Feet, or on one Foot.

THE Foot is not only long and large, but is divided into Toes, and hollow beneath, by which we keep ourſelves more eaſily upright and firmer: The Foot alſo is ſupple, and complies with the different Formations of the Ground we ſtand on; as for Example, in mounting a Ladder, the Heel and Toe approach each the other, graſping the Round as a Hand; and does the ſame Standing or Walking in ſtony and irregular Places. As to its Form, it is not unlike the Hand, excepting, that the Toes are ſhort and cloſe, and the great Toe even with them; but the Fingers are long, and open wide, and the Thumb is oppoſite to them.

THE Gentlemen belonging to our Profeſſion have given us five different Poſitions in Dancing, in which we may ſtand, and from which all Steps in our Art have their Origination,

nation, Progreſſion, and Termination: And tho' we ſhall not pretend to multiply the Number they have allotted us, yet we ſhall take the Freedom of diſtinguiſhing a little upon them, and offer ſome Obſervations of our own, wherein, perhaps, they may have been deficient.

Firſt, IT may not be improper to obſerve to you, That the natural Situation of the Joynts is not ſtrait, but a little bent; and that ſuch Poſition of the Joynts is juſt and natural; and ſo conſequently moſt graceful. For the Joynts are ſo form'd, as to be either extended or bent: The greateſt Extenſion is, when the Joynts are ſtretch'd out in a Line; and the greateſt Flexion is, when the Joints are bent to their utmoſt: 'Tis therefore reaſonable to infer, That a Medium betwixt theſe Extremes (*viz.*) a moderate Flexion, or Bending, will appear to be the natural Conſtitution of the Joynts, and ſo conſequently moſt eaſy, and leſs troubleſome; for both Night and Day we experience, that no Poſture in ſitting, lying, or ſtanding, is ſo eaſy to us, as when the Joynts are a little bent; and this appears really to be the natural Situation of the Joynts, and more obvious, becauſe the Extremities of the Joynts cannot bear too great an Extenſion or Contraction, without a violent Diſtention and Compreſſion of the Tendons, Membranes, and Muſcles.

THIS being compromis'd, we ſhall proceed to *Poſition*, or Standing. And, firſt, in general, let us obſerve, That the Body ſhould be erect, and that the Feet be turn'd outwards, in ſuch manner that the Heels being joyn'd together, the two Feet, a Line being drawn from Toe to Toe, will make an *equicrural Triangle*, whoſe Angle at the Heels will be ſomewhat obtuſe; for if ſuch Angle at the Heels ſhould be acute, then the Toes, though they are not really turn'd inwards, may yet be ſaid by us (as a Term in our Profeſſion) not to be turn'd out.

THE *Rotula*, or Knee-pan, ought to be directly in a Line over the Toe, or point of the Foot; ſo that if the Toe, or end of the Foot, ſhould turn more out than uſual, and the Knee keep in its juſt and natural Situation, ſuch a one may be ſaid to be ſplay-footed; or, if on the contrary, the Foot ſhould be in its proper *Poſition*, and the Knees turning inwards, then ſuch a Man will be call'd Baker-knee'd. It therefore behoves us in our Art, to take a particular Care in preſerving the Knee in its proper Situation; for that ſo preſerv'd, will have conſequently a very peculiar Effect towards the juſt *Poſition*, and regular turning of the Foot.

THE firſt *Poſition* is, when the Feet being joyn'd together, Heel to Heel, form (as I obſerv'd juſt now) an obtuſe Angle. The Weight of the Human Body in this *Poſition*, may be plac'd either on both Feet, equally pois'd, and then the Line of *Propenſion* will fall between both Heels; or elſe, the Weight may be upon one Foot only, and then the Line of *Innixion* will fall from the Center of Gravity upon that Foot on which the Weight depends, the other Foot juſt bearing on the Floor, and its Knee ſomewhat bent. Tho' this *Poſition* may be us'd in ſtanding, yet it is not the moſt graceful Poſture for this purpoſe.

THE ſecond *Poſition* is, when the Feet, from the firſt *Poſition*, ſeparate one from the other ſide-ways in a ſtrait Line; and which I ſhall diſtinguiſh into a ſhort Second, and a long Second: The ſhort Second is, when the Diſtance of the Feet from Heel to Heel does not exceed much above five Inches; and the long, when its Separation extends to ſeven, eight, *&c.* The Line of *Propenſion* in this *Poſition* falls generally between both Feet, and then the Weight of the Body is equally ſupported by each Foot; the Knees ſtrait: And this *Poſition* is one of the graceful Poſtures of ſtanding; but in the ſhort Second, the Line of *Innixion* may be in one Foot.

THE third *Poſition* is, when the Feet are joyn'd cloſe together, but incloſed one Foot before the other, ſo that the Heel of the foremoſt Foot touch the ſide of the Inſtep of the hind-foot. This *Poſition* has the ſame *Propenſion* and *Innixion* with the firſt, and ſeems to be in all other Points the ſame.

THE fourth *Poſition* is the moſt uſeful of any, and is diſtinguiſh'd into the Long, and the Short: This *Poſition* ariſes from the Feet being one before the other, not croſſing, but ſo that a ſtrait Line may be drawn between both Heels: The Long is, when the Foot is extended forwards upwards of ſix Inches, and then the Line of *Propenſion* will fall between both Feet: And the Short Fourth is, when one Foot is not advanc'd above ſix Inches before the other; this Short Fourth is the moſt graceful Poſture of ſtanding; the Line of *Innixion* falling on the hinder Foot, and the former juſt bearing on the Ground, the Knee of the former ſomewhat bent. It is ſome Addition to the Gracefulneſs of this Poſture in Standing, when it borrows ſomething from the ſecond *Poſition*; and may then properly be call'd an open Short Fourth: And this may imply, that there is an open Long Fourth: And if the foremoſt Foot ſhould from the third Poſition move ſtrait forwards into this Fourth, it will then aſſume the Name of an inclos'd Fourth, which may, perhaps, ſome Time hereafter give room for adding to theſe another diſtinct *Poſition*.

A TRANSITION of this *Poſition* from one Foot to another, tranſlates the Body from one Place to another, and produces what we call Walking. As this *Poſition* is the moſt graceful Poſture of Standing, it is requiſite that we endeavour to account for the Beauty of it, by ſhewing, that it is alſo the moſt natural.

EXPERIENCE informs us, that it is eaſier, and leſs tireſome to us, to ſtand on one Foot (that is, the greateſt part of the Weight of the Body reſting on one Foot) than on both together; for when we ſtand on both together, ſome of the Muſcles are in a continued, or Tonic Action; but when we ſtand firſt on one Foot, and then on the other, the Action of the Muſcles is alternate; tho' ſome have imagin'd, that when we ſtand on both Feet, all the Muſcles of both Legs, as well Benders as Extenders, labour under a Tonic Action; and that by changing the Weight of the Body from one Foot to the other, thoſe Muſcles belonging to that Leg on which we ſtand act only; and that the Muſcles of that Foot which before carried the Weight are at reſt, and have little to do till that Foot again returns to its Duty of relieving its Fellow. This Change (ſay they) is leſs laborious, and we are not near ſo ſoon weary, as when the Weight is equally divided and ſupported by both Feet. But the Falſity of this Aſſertion will appear plain upon Examination; for it is allow'd, that a Weight of ten Pounds will be ſuſtain'd in the right Hand only, with leſs trouble by half, than if another Weight of ten Pounds was alſo ſuſtain'd in the left Hand at the ſame Time; for then the double Weight of twenty Pounds is lifted with both Hands as with one Hand alone: But that the ſame Weight of twenty Pounds would be eaſier lifted with one Hand, than if divided into two Parts, ten Pounds were equally ſuſtain'd by each Hand, is falſe. In the ſame manner, the Muſcles of one Foot would be more fatigu'd in ſupporting the Weight of the whole Body, than if the Weight were divided on both Feet, ſo that each Foot might bear its equal Proportion. And, by the by we may obſerve, that when we can hardly move a great Weight in one Body, yet when we divide that Body, we can with Eaſe lift and carry the ſame; becauſe the Power of the Muſcles is ſufficient to overcome the leſſer Reſiſtance, and their Fibres are leſs hurt and diſtended.

MOREOVER, we perceive that the principal, and chief Cauſe of Wearineſs, and Trouble of the animal Faculties, ariſes from a continued, aſſiduous, and tonic Action of the ſame Muſcles; when, on the contrary, we can with leſs trouble ſuſtain heavier Weights, by an interrupted Action, and alternate Reſtings; ſo we may conceive, that we can with leſs difficulty continue a progreſſive Motion for a longer Time, than we can remain in a ſtanding Poſture; the former being an alternate Action of moſt of the Muſcles; the latter a continued, or tonic Action. And it's manifeſt, that an alternate *Poſition*, ſometimes on one Foot, and ſometimes on another, is a ſort of Change, like Walking: For ſuch is the deſire and love of Change, that in ſitting we often lay one Leg croſs the Thigh of the other, and then remove that which was undermoſt, and lay it in the ſame manner upon the other; and this alternate Tranſpoſition, although it be troubleſome, and the Thigh which is under is preſs'd by its own Weight, and the Weight of the incumbent Thigh, yet, I ſay, ſuch a Change is wonderfully refreſhing and delightful.

THE fifth *Poſition* is, when one Foot is extended before the other, and the Legs croſs'd: This is never us'd as a Poſture for Standing, and is only neceſſary for the Riſe, or Terminations of ſome few Steps in Dancing.

THERE are in Dancing five other *Poſitions*, which they call the five falſe Poſitions, but very improperly ſo; for they are not Poſitions, but an irregular Motion of the Feet; that is ſcarce worth our Notice.

HAVING ſhewn the Nature and Manner of Station and *Poſition*, we ſhall now examine how the Body, in a State of Falling, may be recover'd, and preſerv'd upright; though (as has been obſerv'd before) whenever the Line of *Propenſion* of Human Body ſhall fall without the Baſis of the Foot on which the Body ſtands, and is ſupported (*viz.*) without the Quadrangle comprehended by the Feet, then ſuch Body muſt abſolutely fall, nor is it in the Power of any of the Muſcles to prevent the ſame. Some have ſuppos'd, that the erect, or upright Poſture of Man, is preſerv'd by all the Muſcles, Flexors, as well as Extenders, operating in a tonic Action: But they would ſoon be convinc'd of their Error, by conſidering, That Falling may be either forwards, backwards, or ſide-ways: In Falling forwards the Legs bend towards the Feet, and the Spine towards the Knees; for the Thigh-Bone cannot bend forward at the Articulation at the Knee, without a Diſlocation of the Joynt; but the Inclination of the Angles of the Foot and Thigh cannot be ſtop'd and dilated, or enlarg'd, but by the extending Muſcles of the Foot (*viz.*) the *Soleus* and *Gluteus*, and not by the bending Muſcles of the ſame Joynts; for thoſe would rather contribute to the Fall, therefore they remain idle: And thus a Bending, and Falling forwards, can be prevented by the extending Muſcles only, and not by the Extenders and Benders, operating together in a tonic Action.

FALLING backward is, when the Foot being too far extended, the Thigh bending inwards, and the Spine inclining backwards; therefore the Bending at the Knees can only be ſtraiten'd by their extending Muſcles, and not by their Benders: But yet too large an Extenſion of the Foot, and backward bending of the Hip, is prevented by the bending Muſcles of the Foot and Thigh.

IN like manner, a Falling ſide-ways may be prevented, and recover'd, by the Extenſion of the Muſcles plac'd againſt that falling Side; therefore it appears, That Men do not ſtand, ſupported by the tonic Action of all the antagoniſt Muſcles, but only by the Operation of all the Extending, and ſome of the Benders, while ſome of the bending Muſcles at the Knees are at Reſt; whence it ariſes, that the tonic Action can be only in the Feet and Hips, and not in the Knee.

By what has been ſaid we may conclude, that a tottering, or a falling State of the Body, (that is) when the Line of *Propenſion* does not fall without the Baſis of the Foot on which the Body is ſupported, or without the quadrangular Space determin'd by both his Feet; I ſay, ſuch a Falling may be prevented by the bending Muſcles, or Extenders of the Feet and Legs: But when the Line of Propenſion falls without that quadrangular Space ſo determin'd by the Feet; then, I ſay, the Body muſt conſequently fall; except the Fall be prevented by mechanical Helps. And after what manner that may be done, we ſhall endeavour to ſhew.

When the Body, departing from the Line of Innixion, is in a falling State, its Motion of Falling is at firſt ſlow and weak, ſo that a Remedy may be the eaſier applied; for a quick Motion of the Head or Breaſt, ariſing from the animal Force of the Muſcles oppoſite to the falling Side, will recover the Body to its Line of Innixion, and its Fall ſo prevented: Such Recovery is alſo made by a quick Extenſion of the Leg or Arm oppoſite to the falling Side; for by ſuch an Extenſion the ſmall Weight of the Arm acquires a much greater Weight from the length of its *Vectis*, and the Center of Gravity is chang'd, and the Body brought upright.

FOR the lunated *Sinus* of the *Sternum* between the Heads of the *Claviculæ*, hanging perpendicular over the Foot that ſupports the Body, will, upon the ſtretching out of an Arm, quit its Perpendicular, and gain a new Poſition; it will do the ſame upon the Leg, being thrown backwards.

THIS may be further demonſtrated by Rope-Dancers, who poize themſelves not only by the length of their Pole (which Pole, like a Ballance, inclines ſometimes to the right, and ſometimes to the left); but alſo, when the Danger of falling increaſes, the Pole ſtrikes the Air violently towards that ſide, and ſo the Body is reduc'd to an erect and upright Poſture.

TO conclude, it is worth our Obſervation, That ſuch an artificial, mechanical Motion, is by Cuſtom and Habit, acquir'd by us from our Infancy, and without our taking the leaſt Notice of it; and it's to be admired, that in ſuch Variety of Motions in Running, Leaping, and *Dancing*, this Law of Nature, of Ballancing, and equally Poizing our Body, is ſo nicely obſerv'd; and, that whenever it is neglected, or affectedly tranſgreſs'd, Falling conſequently follows.

HENCE alſo it is, that ſtanding with ones Back cloſe up to a Wall, the Breaſt cannot be bent forwards without falling; for it is abſolutely neceſſary in Standing, that the Line of *Propenſion* fall within the Baſis of the Feet.

FOR which Reaſon alſo, a Man ſitting on a Chair, his Breaſt and Legs being perpendicularly erect to the Horizon, cannot poſſibly riſe off his Seat; becauſe in ſuch a *Poſition* the Center of Gravity of the Breaſt and Hips, fall a great deal behind the Soles of the Feet, therefore it is impoſſible to riſe, except the Head and Breaſt be very much inclin'd forwards, or the Legs drawn backwards, and then from the Change of the Center of Gravity, and the Force of the Muſcles extending the Knee, the Buttocks, and Breaſt, will be rais'd up, and the Body brought forwards.

OF

WALKING.

WALKING is perform'd by an alternate Change of the Feet; and transferring the Line of *Propenſion* from one Foot to the other, and by that Means tranſlating the Body from one Place to another; in which alternate *Innixion* only half the Weight of the Body ſeems by turns to be lifted up and carried; as we may apprehend by a Truncheon, of about two Foot long, being laid on the Ground, or on a Table, and by lifting up one end, and moving it forward about eight Inches; the other end being as a Center, and *Axis*, round which it moves; and in ſuch a Caſe, the Power lifting the end of the Truncheon is equal to half the Weight of the whole Truncheon, becauſe that the other half of the Weight is ſupported by the Ground, or Table; then laying

ing that end down, and taking up the other, which before lay ſtill, move as before. But All-wiſe Nature has contriv'd a more compendious Method for Walking; for leſs than a fourth Part of the Human Weight is by turns lifted from the Ground by the Force of the Muſcles.

'TIS evident, that a Man could not walk if his Feet were raiſed alternately from the Ground, and ſet down again in the ſame Place from whence they were taken up; but it is required, and it is abſolutely neceſſary, that the Situation, or Poſition, ſhould be chang'd, and the Weight of the whole Machine of the Body brought forwards. Now let us examine, by what Organs, or Operations, this Motion is perform'd.

AT firſt ſight Human Walking ſeems to reſemble the Motion made by a Pair of Compaſſes erected on a horizontal Plain, or on a Table; which when firſt erected, in Standing will make an *equicrural Triangle*, and the Line of *Propenſion* will fall preciſely between both its Legs. You will eaſily apprehend, that to make theſe Compaſſes (if I may ſo ſay) walk, one Leg muſt be lifted up, and the other on the Ground; then if one Leg is lifted up from the Place, high enough to make the Line of *Propenſion* fall into the Line of *Innixion* of the other Leg, on which it ſtands, and which Leg then will be perpendicular to the Horizon; then in wheeling, or turning the

Compaſſes about the *Axis* of the fix'd Leg, the moving Leg will deſcribe a conic Superficies; then let the Leg before lifted up, be ſet down, and then the Compaſſes will, as at firſt, be erect, and form again an *equicrural Triangle.* Then let the other Leg, on which the Compaſſes was before fixed, be lifted up, and turn and move, as its Fellow had done before, and ſo, by this alternate Motion, and turning of the Compaſſes, a Motion forwards is produced, not unlike that of Walking.

BUT ſuch a manner of Moving for us, would be very abſurd and troubleſome, therefore Nature has contriv'd, for the Human Machine, a more elegant and eaſy manner of Motion; for having form'd the lower Extremities, or Limbs of ſeveral Parts, joyn'd and articulated together, the Flexions from them produce an eaſy compounded Motion: For as we ſtand in the fourth *Poſition,* both Feet equally bearing on the Ground, the Line of *Propenſion* (as has been before obſerv'd) will fall between both Feet, and form the Triangle call'd *Iſoſceles,* or *Equicrural*; and from this *Poſition* it is, that Nature forms, and brings about ſeveral Motions, from whence Walking takes its Riſe.

AND though ſuch an *Iſoſceles Triangle* is like that made by the Compaſſes, yet the Limbs (not being form'd of one Piece, as thoſe of the Compaſſes) by reaſon of its Flexions, acquires a much eaſier Motion.

THE Pillar of the foremoſt Leg, *viz.* the *Tibia* and *Femur*, turning upon its Center, the Foot becomes Perpendicular to the Horizon, and the whole Human Machine moves forwards at the ſame Time, and ſuch Motion is thus brought about; for by extending the hinder Foot prolong'd by the Muſcles *Solei*, an obtuſe Angle is made at the Heel from the Hip and Toe; and becauſe the end of the Foot, or Toe, touches the Ground, the Length of the Hip and Leg is increas'd, by the Addition of the Length of the Foot, and ſo the *Triangle Iſoſceles* is alter'd, and the Feet then making a right Angle *Triangle* (to wit) when the foremoſt whole Leg ſtands Perpendicular to the Horizon; it is to be obſerv'd, in this whole Action, that the Weight of the Body being in this *Poſition* ſupported by both Feet, the leaſt Motion poſſible will bring it forwards, ſo that the Leg may ſtand Perpendicular to the Floor; becauſe from the ſame Extenſion of the Foot, and Elongation of the whole Leg, the Floor is preſs'd by the Toe, or end of the Foot, and by a reflected Motion from thence, the Human Machine moves forward, not unlike a Boat puſh'd from the Shore by a Boat Pole. Moreover, ſuch an Impulſe is wonderfully aſſiſted by the leaſt Inclination of the Head and Breaſt, and ſo the Line of *Propenſion* inclining over the Confines of the Foot, the Body ready to fall, and of its own accord preſſing forwards, ſuch Fall is ſoon prevented, by lifting up the Hind-foot, and bringing it forwards, beyond the Confines of the Line of *Propenſion*; and by that Means you are again ſet upright. And by this artificial Manner, in progreſſive Motion, the Human Machine is moved forwards; which we ſhall farther explain, in deſcribing all the Motions us'd in Walking.

WHILE a Man walks, his weighty Fabrick always bears on the Ground fix'd, and is ſupported by the bony Pillars of the Limbs; which Bearing is effected, and aſſiſted, by a little labour of the Muſcles, and ſome ſmall trouble to the ſenſitive Faculty, by reaſon of a Compreſſion of the Tendons, and a Diſtention of the Membranes. Further, while we ſtand on both Feet, in the fourth *Poſition*, the Motion of ſetting forward the Center of Gravity, or the moving of the whole Body forward, ariſes by the whole hind-moſt Limb being lengthen'd by the Extenſion of its Foot, by preſſing the Ground with the Toe, or end of the ſame Foot; raiſing up the Heel erects the whole Machine perpendicular upright and firm upon the fore-moſt Foot: The hind-moſt ſo lengthen'd, is preſently rais'd from the Ground, the three Joynts, of the Hip, Knee, and Foot, being a little bent by their proper Muſcles, which ſupports leſs than a fourth Part of the Human Weight, and by the Force gain'd by the foregoing Impulſe, and from a Bending, or Inclination forwards of the Head and Breaſt, the Hind-foot moves forwards, and is fix'd on the Ground beyond the *Poſition* or Situation of the firm Foot; by which Means a ſecond Station is attain'd; and then the Hind-foot operating at the ſame Time, in like manner as before, a progreſſive Motion is continued.

NOW Gentlemen, it will not be improper next to obſerve to you, That we cannot walk preciſely in a right Line, becauſe the Human Machine cannot go, unleſs it ſucceſſively bear upon the Ground by an alternate Motion of the Feet; and ſuch a Bearing is caus'd, by transferring the Line of *Propenſion* one while upon the Sole of the right Foot, and another while upon the Sole of the left Foot; and ſuch a Tranſlation is not carried on in a ſtrait Line, but by two right Lines parallel to themſelves; for 'tis plain, in obſerving the Tracts of Mens Feet, walking in Duſt, Sand, or Snow, that the Steps will appear Parallel in themſelves, and not to make one right Line in Tranſition. Moreover, Geeſe, Ducks, and broad ſett Men, who have ſhort Thighs, do not plainly move their Feet in two parallel Lines, but by a certain Wadling, walk alternately, by raiſing themſelves ſometimes on the right, and ſometimes on the left Foot, and by transferring the Center of Gravity: We all do the ſame Thing, though not ſo manifeſt, or in ſo great a degree. For take two Rods, and erect them Perpendicular upon ſome Bowling Green, or even Ground, one being White and the other Black;

let them be ſo erected, at ſome conſiderable diſtance one from the other, and let a Man ſtand in a direct Line with the Rods, the black Rod being next to him, ſo that it may cover the white Rod; then, though he uſe his Endeavours to go preciſely in the ſame right Line, he will find he cannot effect it; for he will ſee by turns the white Rod one while on the right ſide, and another on the left of the ſame black Rod, that is between him and the white Rod; and which, I preſume, will be a ſufficient Argument that we cannot walk preciſely in a right Line. For, again, the Line of Propenſion being transferred on each ſide, in a waving, and ſerpentine Courſe, the Human Machine cannot perform this progreſſive Motion, call'd Walking, by one ſimple ſtrait Line.

WALKING on level Ground, or on a Floor, is not only eaſy to us, and no Ways troubleſome, but it is alſo pleaſant, becauſe in Walking the Joynts bend only by an inſenſible Flexion, and juſt ſufficient to prevent the Sole of the Foot from ſtriking forcibly on the Ground or Floor: So that the bending Muſcles in this Motion have but little trouble, for the Soles of the Feet are not oblig'd to be bent and unequal, or ſuffer a too great Diſtention or Luxation, as they muſt neceſſarily have done in complying with irregular and uneven Ground, and walking upon ſharp Stones, *&c.* The Motion therefore of the Joynts in walking

ing on even Ground, not being laborious nor troubleſome, is eaſy and pleaſant, and aſſiſts the Circulation of the Blood; increaſes the animal Spirits; helps Perſpiration; invigorates and refreſhes all the Parts of the Human Body, if not continued too long, or uſed too violently. This may give us no little Idea, how healthful an Exerciſe that *Dancing* muſt be which we profeſs; becauſe, the *Dancing* taught by us to Gentlemen and Ladies, is not only a Motion natural and eaſy, and without too much bending, or extenſion of the Joynts, but the Variety of the Motions makes it ſtill more agreeable; and as (I have obſerv'd before) by the natural Love we have to Change, a Continuance of ſuch Motion ſeems to be leſs tireſome, and more pleaſant, than Walking.

BUT a Walking up a ſteep Place is very tireſome, becauſe ſuch Aſcent in its Action, is like that of going up Stairs, or up a Ladder, which we find, experimentally, to be very troubleſome; nor is the Cauſe of ſuch an Effect hard to be found out, when the Operations of the Joynts, which are made in ſuch an Aſcent, are duly, and exactly conſider'd; for in ſtanding upon both Feet in the lower-moſt Round of the Ladder, ſuppoſe the right Foot to be lifted up Perpendicular to the Horizon, in order to attain the ſecond Round; ſuch an Elevation muſt firſt be higher than the ſecond Round, and cannot be made without a great deal of bending of the Joynts; in which the natural Length of the bending Muſcles will be looſen'd, and ſo there will be a violent Contraction of them by a laborious Endeavouring; again, from the Impulſe of the Innixion made by the ſame right Foot, before it leaves the firſt Round; and from the Inclination of the Head and Breaſt, the former Center of the Gravity of the Human Body, is mov'd forwards; and ſo when the ſame right Foot bears on the ſecond Round of the Ladder, then the Line of *Propenſion* falls Perpendicular upon the ſame Foot ſo placed upon the ſecond Round, the left Limb hanging down; now the right Limb being bent, and bearing on the Sole of the Foot upon the ſecond Round, muſt be directed Perpendicular, and the whole Weight ſupported by the ſame right Limb; but ſuch Operation cannot be effected, unleſs the Inclinations of the three Joynts, the Hip, Knee, and Heel, be lengthen'd and extended; which Action is difficult, becauſe the whole Weight of the Human Machine ought to be rais'd Perpendicular; and therefore the fourth Part of the Weight of the Human Body ought to be twice ſuſtain'd, and ſuſpended by the Force of the Muſcles, in aſcending one Round of the Ladder; and the whole Weight of the ſame Man once; of Conſequence then, the faſter we climb the Ladder, the more laborious and troubleſome it will be: For let us conſider, that in Walking on a plain Superficies, or even Ground, the whole Weight of the Human

Body is never ſuſpended, or elevated, by the Force of the Muſcles; becauſe it is always bearing upon the Ground, either on one Leg or the other, ſupported by the bony Columns. But in an Aſcent by Steps, the Elevation of the Weight of the Body is made by the Force of the Muſcles, and not by the Hardneſs of the bony Columns; and hence it is, that ſuch Aſcent becomes ſo laborious and troubleſome, and ſo ſoon brings on Wearineſs. Moreover, in an Aſcent of a Hill, or the like, as we ſtand on the Ground, the Soles of the Feet make Angles with the Legs; in which unnatural Poſition, the extending Muſcles are too much diſtorted, nor is the *Innixion* firm; therefore laborious and troubleſome.

A WALKING down Hill is alſo more tireſome to us; than going upon an horizontal Plain; for in a Deſcent, either by Steps, or on a declining Plain, neither the Thighs, nor the whole Machine of the Human Body, ought to be elevated, or raiſed upwards; for it falls of its own accord, by the Force of its own Gravity; and for this Reaſon a Deſcent is commonly thought to be moſt eaſy. But let us more ſtrictly examine into this Affair, and it will undoubtedly appear, that a Deſcent, or Walking down Hill, and the like, is not perform'd without great Labour and Pains. As for Example, let the right Foot be a little lifted up, ſo that a Man might leave his Station on the higheſt Part of a Ladder; and then, if the Center of Gravity be mov'd forwards, the whole Weight would undoubtedly fall; and the Foot being directed towards the next Round, would be daſh'd againſt it with much Violence and Pain; but ſuch a Misfortune will be avoided, by retaining the Center of Gravity in its old Situation (to wit) by keeping the Line of *Propenſion*, and preſerving the Body erect Perpendicular upon the Sole of the Foot, bearing upon the firſt Step; then the whole Body deſcending, the Joynts of the Limb that bears on the Round becomes bent, and the other Limb moving downwards, being ſtretched out, the whole Machine is ſupported till the deſcending Limb reach the next Round, and ſuch a Suſtention of the Weight of the Body by the Muſcles, is not without a laborious Action of the extending Muſcles, ſenſibly eaſing themſelves; and ſuch Labour of deſcending is ſo much the greater, by how much more ſlowly we deſcend the Steps. Now, ſuch a Neceſſity of Suſtaining is not required from the Muſcles in walking on level Ground, becauſe that alternate Suſpenſion proceeds from the hardneſs of the bony Columns; by which we conclude a Deſcent more laborious than walking on level or plain Places.

And in deſcending a ſteep, plain Superficies, the Soles of the Feet (as in the Aſcent) make alſo Angles with the Legs; which unnatural Poſition is very laborious. From what we have obſerv'd on Aſcending, or Deſcending, we may eaſily conceive, how much more laborious *Groteſque Dancing* will be than the Serious; and how, in the *Serious*, a *Spaniſh*, or very ſlow Movement, or Character, will be of much greater Fatigue to the Muſcles, than the *Chaconne*; *Minuet*; or other Movements of the ſame Nature.

OF

Leaping, or *Springing*.

LEAPING, or Springing, differs from Walking in this, that in Leaping the whole Body is thrown into the Air, both Feet being at the ſame Time elevated from the Ground or Floor; but in Moving, or Walking, the Body always bears on the Ground or Floor, either on one Foot or other; in which alternate *Innixion* it appears, that half the Weight of the Body is, by turns, ſupported and moved, (as before).

THIS Springing, or Leaping, cannot be perform'd, except the Joynts of the Limbs are firſt bent.

FOR 'tis plain, that a Man ſtanding with both his Knees ſtrait, and his whole Body directly upright as a Pillar, let him be ever ſo willing, and uſe his utmoſt Endeavours, he will never be able to ſpring, or leap, from the Floor; becauſe Springing, or Leaping, is produc'd from a conſiderable Flexion, and bending of the Joynts; and then by the extending Muſcles being contracted, and drawn with great Violence. Some Brutes, or Inſects, who have all their Limbs, or at leaſt their hinder Limbs, always bent, leap naturally, and with much eaſe; but when they would leap to any conſiderable Diſtance, or Height, they are then oblig'd to bend the Joynts more than uſual.

To explain better the Nature and Manner of Leaping, or Springing, take a Whale Bone of any length, it is indifferent; but ſuppoſe of two Foot long; ſet it upright an end on the Table, then, as you hold the upper Part in your Hand, the other reſting on the Table, with your Hand preſs down the upper Part of the Whale Bone, ſo that then it being bent, it will make a curv'd Figure like a Bow; then ſuddenly taking off your Hand from the Whale Bone, you will find, that it will not only regain its Direction, but will alſo ſpring up, and be lifted from the Table by a quick Spring or Leap: The Cauſe of which I ſhall endeavour to ſhew. The Center of Gravity of this Whale Bone, as it is upright, will be in its middle, that is, a Foot diſtance from the Table, but when preſs'd by the Hand to the curved Figure, like a Bow, the Center of Gravity will then fall ſome Inches lower; ſo that when the Hand is taken away from the top; the curved Bow dilates it ſelf with ſome Violence, and extends both Ends directly to recover its firſt Center of Gravity; but as the Table prevents the lower End from extending it ſelf as the upper does, ſuch Impediment occaſions a reflected Motion, as well as a directed Motion, and neceſſarily forces it from the Table, and produces what we call Leaping, or Springing; for after the Whale Bone has acquired ſuch an extenſive Direction, its force does not ceaſe, but continuing ſtill farther, raiſes it from the Table as if it had been thrown from thence.

By which we may conceive, That the Human Figure ſtanding upright, ſo that the Bones of the Thighs, Legs, and Spine, compoſe an erect Column, ſtanding Perpendicular to the Horizon, the common Center of Gravity will be diſtant from the Floor the whole length of the Legs and Thighs; afterwards by bending the three Joynts, the Hip, the Knee, and the Heel, till they make acute Angles, the Center of Gravity will then be diſtant from the Floor about the length of the Leg only, which is much about half the Diſtance of what it was when the Body was upright; if then, from this Poſture, the Muſcles *Glutei*, *Vaſti*, & *Solei*, are forcibly, ſuddenly, and at the ſame Time, contracted, the three bended Joynts will then be extended with great Force, and by reaſon of the Reſiſtance of the Floor, the Center of Gravity will neceſſarily riſe to its priſtine Situation; but ſince ſuch a violent Motion cannot be perform'd without an impreſs'd Force, therefore ſuch an acquired Force perſevering, cannot ſtop, but will conſequently remove the whole Body from the Floor on which it ſtood; which is Leaping, or Springing; and again, ſuch Leap will force it ſelf through ſome Space, as long as the Force of the Gravity, by little and little increaſing, becomes equal to the Force of ſuch Riſing, and then the Body will fall down again to the Place from whence it ſprung or leap'd.

RULES AND INSTITUTIONS FOR DANCING.

HAVING in the foregoing Lectures endeavoured to inculcate, how requiſite ſome *Anatomical* Knowledge of the Bones, and Muſcles, of the Human Body; and how uſeful a little Skill in *Mechanicks*, would be to the Maſters in the Art of *Dancing*, I ſhall venture to ſay, That without ſuch a Knowledge, and Skill, *Dancing Maſters* will never arrive to any Certainty in their Art, either in the Performing, or Inſtructive Part; but will be always liable to vary, and change their Manner of Performance, and Method of Teaching, according to Fancy, or Opinion. For 'tis plain, that without Rules there can be no Art; and alſo, that 'tis impoſſible to be Maſter of any Art without the *Theory*; ſince upon that Foundation 'tis, that the Practice muſt be built. And I flatter my ſelf I ſhall be able to evince, That the whole Art of *Dancing* depends upon the foregoing Rules; and, that from an excellent Skill in the practical Part of this Art, and a perfect Acquaintance with the Rules and Inſtitutions of it; great Improvements may be deriv'd to our Profeſſion, which will not only a little add to its Reputation, but be alſo of univerſal Benefit to all Lovers of Elegance and Politeneſs.

IN order to demonſtrate which, we ſhall begin with Standing, and ſhew, from whence the Preſence, and Gracefulneſs of that Poſture ariſes.

STANDING in a graceful Poſture, can be only in two of the five *Poſitions*; for a Man, (*viz.*) in the ſecond *Poſition*, either long or ſhort; and in the ſhort Fourth. And for a Woman, in the Firſt; ſhort Second; and ſhort Fourth *Poſitions*.

WHEN a Man ſtands in the long Second *Poſition*, his Body will be equally pois'd on both Feet, the Line of Propenſion falling from the Center of Gravity between them; but in either of the other *Poſitions*, as well for the

Man as for the Woman; the Weight of the Body ſhould be on one Foot, the Line of Innixion falling thereupon; and the other Foot bearing a little upon the Floor, and its Knee ſomewhat bent. The Gracefulneſs of this Poſture requires the Body to be erect, the Head upright, and eaſy, and always a little inclining, or ſomewhat turn'd towards one ſide or the other; its Motion to be free, natural, and various; which gives an Air and Vivacity to the whole Body: The Shoulders not ſhrug'd up, or thruſt forwards, but hanging eaſy in their natural Situation; and the Cheſt, or Breaſt, extended, that it appear full. Though the Placing, or Diſpoſition of the Arms and Hands alter, and vary according to Faſhion, Fancy, and Opinion, yet there are ſome certain Rules we cannot deviate from, without breaking in upon that Harmony ariſing from the regular Diſpoſition of the Parts, which produce Gracefulneſs. We are therefore to take care the Elbows be not preſs'd too cloſe to the Body, nor ſet too much out; neither are they to be drawn too much backwards, or brought too far forwards; but to fall eaſily down, and not to appear Stiff or Obſtinate; and, that the tip of the Elbow be plac'd even with the middle of the Sides of the Body.

THE Poſition of the Hands ought to be directed, or govern'd by the *Poſition* of the Feet: they will either be both the ſame, or contraſted, (that is) when each Hand has a Poſition not only contrary each to the other; but alſo a contrary Poſition to the Foot of the ſame ſide. The Fingers ſhould be a little bent, and open from each other.

IN Walking gracefully I ſhall only remind you, that Walking is perform'd from the fourth *Poſition* to the fourth *Poſition*: That one Foot is always on the Floor, and the Line of *Direction* is transferr'd from the Baſis of one Foot to the Baſis of the other. The Heel always moves firſt from the Ground, and is firſt put down again. The Motion of the Body is continued, and ſhould be very eaſy and natural. The Members equally ballanc'd on their Center; and the Motion of the Arms and Feet contraſted; which Contraſt ſeems to me to be the very Soul (if I may be allow'd that Expreſſion) of Gracefulneſs.

IT is worth our obſerving, that the Rules laid down, for theſe and the following Actions, or Motions, are according to the Dictates of Nature; agreeable to the Laws of Mechaniſm; and conſonant to the Rules of Proportion: And, that whatever Poſitions, or Motions, derogate from theſe Laws and Rules; ſuch Attitude, or Action, will be abſurd, awkward, diſagreeable, and ungentile.

WE will now lay down the Rules for, and the Motions of (what we call in our Art) the making an Honour.

THE Honour, or Bow, for a Man, we ſhall take from the moſt graceful *Poſition*, (*viz.*) the ſhort, open Fourth; Rules for which will be ſufficient Information to us, for all the Performances of this kind.

SUPPOSE then the Man ſtanding in the open, ſhort Fourth *Poſition*; and the Line of *Innixion* from the Center of Gravity falling on the left Foot, which is behind; then the right Foot, which is foremoſt, will bear only lightly on the Ground or Floor, the Knee ſomewhat bent; then from this graceful *Poſition*, let the right Foot move to the ſhort, ſecond *Poſition*, the whole Body moving with it, and the Line of *Innixion* be transferr'd from the left Foot to the right, the left Foot will then bear only lightly on the Floor, the Heel ſomewhat rais'd from thence, and Knee ſtrait; then by drawing the left Foot ſo rais'd on its Toe, along the Floor, until it fall behind the right Foot in the ſhort inclos'd fourth *Poſition*, the Line of *Innixion* will again be transferr'd from the right, to the left Foot; the right juſt bearing on the Floor, and the Knee ſomewhat bent as before. The Rule for Bowing, or Motion of the Body is, (as I take it to be) as follows. The Motion of the Body, and Motion of the Feet, ſhould be both at the ſame Time, and end together: (that is) The Inclination, or Flexion of the Body, or the Bowing, ſhould begin, and continue with, and during the Motion of the firſt Step, and the Extenſion, or Erection of the Body, ſhould commence, and gradually riſe with, and during the Motion of the ſecond Step: So, that all the Parts of Body, and Limbs begin, and finiſh their Motions together. The Hands and Arms in this Action will fall naturally forwards on the Flexion of the Body, and return on the Erection to their former Situation.

THE Honour for a Woman is commonly call'd a *Curteſy*; a Rule for making which, in general, will be beſt explain'd, by deſcribing a regular Method, and Manner, of a young Lady's making her Honour before ſhe begins to Dance.

WE will then preſent her to your View ſtanding in the ſhort Second, or ſhort Fourth *Poſition*; her Body erect; her Head upright; and her Arms falling naturally to her Sides; not bearing upon the Hips, but juſt freed from the Body; the Cubit and Hand, together with the Arm, extended obliquely downwards; the fore Finger and Thumb taking hold of the Petticoat; the Wriſt even, and turn'd a little outwards; the Palm of the Hand towards the Thigh; the whole Arm unconſtrain'd, neither preſſing on her Coat, or diſplaying of it. The whole Weight of her Body being then ſupported on her left Foot, the right juſt bears on the Floor; from this graceful *Poſition* ſhe ſinks, her Knees bending outwards, the Line of *Innixion* ſtill continuing on the ſame left Foot: Juſt at the Concluſion of her Sinking ſhe transfers the Line of *Innixion*, by the Motion of her Body from the left to the right Foot; and then riſes Perpendicular, ſtill preſerving the Weight on her right Foot, which finiſhes her firſt *Curteſy*.

I NEED not inform you, that the Gracefulneſs of this Action ariſes from the Motion of transferring the Line of *Innixion*; to which a little turn of the Head towards the left Shoulder, is no ſmall Addition.

THE left Foot now being at liberty, and bearing ſlightly on the Floor, is ready to move; ſhe then carries the left Foot obliquely forwards to the inclos'd fourth Poſition, her Body moving with it, and ſo transferring the Line of *Innixion* from the right to the left Foot; ſhe then moves the right Foot circularly, at the ſame Time turning her Body a quarter Turn towards the left, and brings her Feet into the ſhort ſecond *Poſition*; the Weight of the Body alſo, as in Walking, transferr'd with it: The Weight being now on the right Foot, ſhe ſinks; transfers the Line of *Innixion*; and riſes as before; the Weight of her Body is now on her left Foot, and the right Foot bearing only on the Toe, is ready to move.

THIS leads me to a farther Application of the foregoing Rules, to ſome of the fundamental Steps, and Movements in Dancing.

BUT, *Firſt*, It will not be improper to explain, what Dancing is, and in what it conſiſts.

DANCING is an elegant, and regular Movement, harmonically compoſed of beautiful Attitudes, and contraſted graceful Poſtures of the Body, and Parts thereof.

THE Motion conſiſts of various Steps, produc'd by the Sinking, Riſing, Turning, and Springing of the Body and Limbs.

SINKING is a Flexion, or Bending of both the Knees, and is us'd in every *Poſition*; the Line of *Propenſion* ſometimes falling betwixt both Feet, and ſometimes upon one; though there are ſome Steps in Dancing, that require only one Knee to be bent, while the other is mov'd extended. A Sink ſhould always be made on the flat Foot (*viz.*) when the *Os Calcis*, or Heel, and Ball of the great Toe, are implanted to the Floor.

RISING is an Extenſion from a Flexion, or Bending of the Knees, and is the Antagoniſt to Sinking. There is alſo a Riſing when the Knees are ſtrait, and that is on the Toes. ' * The Bones of the Foot united together, ' may be compared to a Lever plac'd under ' any great Weight in order to raiſe it; for the ' convex Part of the *Talus* being plac'd juſt ' under the *Tibia*, which ſuſtains the whole ' Body; the long hinder Proceſs of the *Os* ' *Calcis* being, as it were, the handle of this ' Lever, and ſo rais'd by the *Nervus Hecto-*

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* Baker *on the Bones.*

‘ *ricus*, which is ſtrongly inſerted there. This ‘ Nerve, or rather Tendon, is compos’d of ‘ three or four Tendons of ſeveral Muſcles of ‘ the Leg, as *Solaris*, *Gaſterocnemij*, &c. and ‘ with it the whole Body is raiſed upon the ‘ Toes.

This Sinking, and Riſing, ſeems to be to Dancing, as Light and Shades are to Painting.

The firſt Movement in Dancing is a half Coupeé, and is only one Step, or one Movement; it is to be perform’d ſeveral Ways, as forward, backward, ſideways, obliquely, open, and circularly, *&c.* and may be taken from the Firſt; the ſhort Second; the Third; or ſhort Fourth *Poſition:* But in ſhewing the Manner of its Performance, I ſhall take it from the firſt *Poſition*, and perform it ſtrait forwards.

The Weight of the Body, in this Step, will be always on one Foot; and the Line of *Innixion* transferr’d (as in Walking) from one Foot to the other. The Line of *Innixion* falling therefore on one Foot; Sink; the Knees bending outwards; let the Foot that is free from the Floor move forwards at the ſame Time as the Sink is performing; the Body is upright, and inſenſibly moves a little with it, but not beyond the Baſis of the ſtanding Foot; then the moving Foot being brought forwards, and ſet down in the ſhort Fourth *Poſition*, extends it ſelf at the ſame Time, and transfers the Body thereupon Perpendicular to the Horizon; the other Foot coming into the firſt *Poſition*, bears lightly on the Floor, and is ready to move, as before. The Hands and Arms, in this Movement, will be contraſted.

A COUPE'E begins in the ſame Manner, and with the ſame Motions, as the former; only the half *Coupeé* being but one Step, if continued, will be perform'd alternately, firſt with one Foot, and then with the other; but this *Coupeé* being compos'd of two Steps, will, if continued, commence always with the ſame Foot; the other Difference ariſing is, that in this laſt, the Body, as in the firſt, being brought upon the firſt Step by the Extenſion of the Leg, the other Foot comes ſtrait forwards into the fourth *Poſition*, and makes the ſecond Step, which transfers the Body thereupon, the other Foot coming up to the firſt *Poſition* as before. In Walking it was obſerv'd, That the Heel was always taken from the Floor firſt, and ſet down again firſt; but, in Dancing, it is otherwiſe, and eſpecially after a Sink, the Toe always comes to the Floor firſt.

A MARCH (or, as the *French* call it, *Un Pas grave*) is perform'd from the fourth *Poſition*. In Sinking the Body comes Perpendicular to the Horizon on the foremoſt Foot; and in the Riſe the Hind-foot is mov'd obliquely, forward to the ſhort ſecond *Poſition*, the Toe pointing to the Floor, and the Line of *Innixion*

nixion continuing on the ſame Foot as before; then let the moving Foot continue its Motion; and by moving obliquely forwards the contrary way to what it did before with a ſtrait Knee, it will arrive to the fourth Poſition; and the Line of *Propenſion* may fall either between both Feet; or otherwiſe, on the foremoſt Foot. The Arms in this Movement, as in the half Coupeé, will be contraſted.

A BOUND, and a *Hop*, are both call'd Springing; their Difference ariſes, that the Springing of the one, is from one Foot to the other, which is call'd a *Bound*; and in the other, the Weight of the Body falls on the ſame Foot from which it took its Spring, and is call'd a *Hop*.

A BOUND is taken from either of the *Poſitions*, except the fifth; and differs from the half Coupeé in this, that as in the one (*viz.* the *half Coupeé*) the Body always bears on the Floor, either on one Foot or the other, as in Walking; and in the *Bound*, the whole Machine is lifted up, or thrown from the Floor, as in Running, *&c.*

A HOP is perform'd from all the *Poſitions*: From the firſt and third the Line of *Innixion* falls on one Foot, and the Sink, as Preparatory to the *Hop*, is with both Knees; a brisk Extenſion from this Flexion throws the whole Body from the Floor, and the Body falls on the ſame Foot from which it principally receiv'd its Riſe. From the ſecond, fourth, and fifth *Poſitions*, the Line of *Innixion* will generally fall between both Feet, and both Feet, as it were, ſpring from the Floor together, but do not really, in effect, do ſo; for the Fall ought to be on that Foot which laſt left the Floor, and, which contributes moſt to this Spring: Sometimes the Line of *Innixion*, in this Step, will fall on one Foot. Many of the young Practitioners in our Profeſſion, are apt to miſtake in the Movements of this Step; and more eſpecially, in what we call *Contre Temps*, or *Compos'd Hops*.

I HOPE theſe few Obſervations may be ſufficient to evidence, how neceſſary it is, that ſuch Rules as have been here advanc'd, ſhould be apply'd to all the Steps and Movements in Dancing; yet I muſt, at the ſame Time, confeſs, that there is a certain Carriage of the Body and Limbs, in the Performance of almoſt all Steps in *Dancing*, which gives a peculiar Grace and Air to the Motion; which is not only very difficult to attain; but much more ſo, to lay down Rules for them.

Muſick. I am very well ſatisfy'd it is not expected from me; that I ſhould uſe any Endeavours to prove, how uſeful *Muſick*, in relation to Sounds, is to the Art of *Dancing*; ſince 'tis ſufficiently obvious, that *Dancing* cannot be perform'd without its Aſſiſtance; and, that the Beauty of the Performance, does not a little depend upon the

Harmony ariſing from the Motion of the *Dancer*, juſtly adapted to the Sounds of the *Inſtruments*; and the meaneſt in our Profeſſion cannot be ignorant, how neceſſary a ſmall Skill in the practic Part of this Science, is to every one who profeſſes himſelf a Maſter; nor will he deſerve that Name, except he be alſo capable of inſtructing thoſe under his Care with ſuch a Knowledge of Sounds, as they might juſtly adapt the Motion of the Body, and Parts thereof, to the Time of the *Muſick*. But before I proceed, it is neceſſary to inform you, That what I ſhall farther advance upon this Subject of *Dancing*, is only calculated for *Dramatick Performances*; and, when I ſpeak of a Knowledge in *Muſick*; *Rhetorick*; and *Painting*; I would be underſtood only, as they are neceſſary Qualifications, for ſuch who intend to arrive to the utmoſt Perfection of this Art, or deſign to apply themſelves intirely to the Stage, and in the Compoſition of *Opera Performances*, or of *Dramatick Entertainments* in *Dancing*. It is therefore requiſite, for ſuch a Maſter in our Art, to have, not only an univerſal Knowledge in *Dancing*, and to apply himſelf to the Study, and Conſideration of all *Characters*; but alſo, ſo much Skill in *Muſick*, as, at leaſt, to be able to give Inſtructions to a Maſter in *Muſick* for the Compoſition of his Airs; to judge, whether ſuch *Muſick* expreſs well his *Ideas*; be juſtly apply'd to his Deſign; and well adapted to the Characters he would repreſent; nor ſhould he be wanting in the practical Part, whereby to capacitate him (in a peculiar Taſte, or Manner appropriated to our Art) to inſpire, and give a Spirit to his Performers. How happy therefore, would it be, were a Maſter in *Dancing* ſo far skill'd in *Muſick*, as to be capable of making, and compoſing his own Airs; for though our Nation, and eſpecially LONDON, is ſupply'd with Maſters in *Muſick*, equal with any in EUROPE; yet would it not be a little difficult to find one, capable of giving into the Deſign, or troubling himſelf with entering into, or receiving the *Ideas*, or Notions of the *Dancing Maſter*. Though it was my good Fortune, when I compos'd the Entertainment of MARS and VENUS, to be recommended to Mr. SYMONDS, of whom I ſhall ſay no more, than, that the *Symphonies* he was ſo kind to give me for that Entertainment, were ſo well ſuited to the Subjects they introduc'd, that they ſufficiently ſhew'd the Skill of the Compoſer, at the ſame Time as they imbelliſhed the *Performance*: Nor, was its good Reception by the Town leſs owing to the muſical Airs of the *Dancing* Parts, compos'd by Mr. FIRBANK, who, by a juſt adapting his Sounds to the Paſſions, and Affections of that *Entertainment*; as likewiſe, to thoſe of ORPHEUS and EURYDICE, has evidently demonſtrated (as he is one of the firſt in our Art of *Dancing*) how neceſſary a Knowledge in *Muſick*, is to thoſe of our Profeſſion, who attempt *Dramatick Entertainment* of this, or the like kind.

Rhetorick. IT now behoves us to inform our ſelves, what Uſe a Knowledge of *Rhetorick* will be to us in our Profeſſion; and ſuch Knowledge is only requir'd of a Maſter of *Dramatick Dances*; and then only, as far as ſuch *Dances* have relation to the *Manners*, *Paſſions*, &c.

RHETORICK is an Art of Eloquence, which ariſes from an elegant Choice of Words, perſwaſive, and of ſuch Force, as ſo to expreſs the Paſſions, as to raiſe, or allay the Affections of Man. What *Rhetorick* is to the *Orator* in Speaking, is to the *Dancer* in Action; and an Elegance of Action conſiſts, in adapting the Geſture to the Paſſions and Affections; and the *Dancer*, as well as the *Orator*, allures the Eye, and invades the Mind of the Spectator; for there is a Force, and Energy in Action, which ſtrangely affects; and when Words will ſcarce move, Action will excite, and put all the Powers of the Soul in a ferment.

AND, as it is the Buſineſs of a *Dancer* of this kind, as well as the *Rhetorician*, to treat the Characters of the Paſſions, he ought to take care, that his Subjects, and the Action ariſing from them, have nothing in them *Immoral*, *Low*, or *Indecent*.

I SHALL only add, That as there are many Paſſions, as *Love*; *Hatred*; *Grief*; *Joy*;

Deſpair, *Hopes*, *Fear*, *Anger*, &c. and others of a leſſer Degree, which may be call'd Affections; as *Tranquility*; *Grace*; *Civility*; *Gentleneſs*; and the like; ſo there are, not only different Actions for theſe different Paſſions, and Affections; but alſo, Variety of Actions, for each of theſe Paſſions, or Affections; all which the Dancer ought to know, and how to vary, as his Judgment ſhall direct him; and to be elegant in his Choice.

Painting. LASTLY, How Advantagious it muſt be for a *Stage Dancer*, and *Maſter*, to make himſelf acquainted with Paintings, Drawings, and Prints; and, to make a perfect Judgment of thoſe that are Good, will appear from an Analogy between *Dancing* and *Painting*.

THE *Dancing Maſter*, as well as the *Painter*, ought to be endued with a Genius capable of expreſſing the Paſſions he would repreſent; and to make the Dumb, as it were, to ſpeak; he ought to give his Performers, as the Painter does his Pictures, proper * Attitudes, that may be regular, agreeable, and juſtly contraſted by contrary Motions, and preſerve the Body carefully pois'd on its own Center; his Contraſt ſhould be always natural, and never extravagant; he ought to be well acquainted with *Ordonnance*, or *Diſpoſi-*

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* *Attitude is a* Poſture, *or* graceful Diſpoſition of the Body, *in* Standing; Sitting; *or* Lying.

tion, that he may be capable of *Grouping* his Performers, or Placing his Dancers (as in a Picture) in a regular, beautiful, and harmonious Order. His principal Performer ought to appear in the principal Light, to diſtinguiſh it from the reſt; ſo that it may firſt catch the Eye; and the reſt of the *Dancers* ſhould be as Members to the Action, as growing out of it, and not inſerted into it.

LET his *Attitudes* be ſuitable to his Subject, ſo as to expreſs the Thoughts and Conceptions of the Mind, by the Motions of the Eyes, Hands, and whole Body.

THE *Dancer* will, without Diſpute, find great Aſſiſtance from his Acquaintance with *Painting* and *Prints*, in the Choice of his *Attitudes*; in the *Contraſting* his Actions; and, in a juſt Imitation of the Paſſions; becauſe the Actions produc'd, and the Variety of the Motions ariſing from them, in repreſenting ſuch Paſſions; will never fail of moving, and giving Delight to the Spectator.

I AM perſwaded, by what has been advanc'd in theſe Lectures, it will appear, That a Knowledge in *Anatomy*; *Mechanicks*; and *Muſick*; is not to be ſlighted by the Profeſſors of the Art of *Dancing*, and that a ſmall Acquaintance with *Rhetorick* and *Painting*, as far as they relate to the Manners and Paſſions; are abſolutely required from the *Maſter*, who intends to arrive to the utmoſt Perfection of the Art of DANCING.

THE
NAMES
OF THE
BONES
Mention'd in theſe
LECTURES.

Os Occipitis		the hinder Part of the Head, 1.
Vertebræ	*Cervicis,*	of the Neck, 7.
	Dorſi,	of the Back, 12.
	Lumborum,	of the Loins, 5.
Os Sacrum		the Baſis of the *Vertebræ*, 6.
Os Coccygis		the Rump Bone, 3.
Scapulæ		the Shoulder Blades, 2.
Claviculæ		the Collar Bones, 2.

Coſtæ		the Ribs, 24.
Sternum		the Breaſt Bone, 1.
Oſſa Innominata	*Os Ilium,* *Os Pubis,* *Os Iſchium,*	the Hip Bones, 2.
Humerus		the Arm Bone, 2.
Cubitus	*Ulna,* *Radius,*	the fore Arm, 4.
Carpus		the Wriſt Bones, 16.
Metacarpus		the Hand Bones, 8.
Digiti		the Fingers, 30.
Femur		the Thigh Bone, 2.
Rotula		the Knee Pan, 2.
Tibia, *Fibula,*		the Leg Bones, 4.
Tarſus		the Ankle Bones, 14.
Metatarſus		the Bones of the Feet, 10.
Digiti		the Toes, 28.

Atlas,	the firſt	*Vertebra.*
Epiſtrophæus,	the ſecond	
Axis,	the third	
Olecranium	the Tip of the Elbow.	
Os Calcis	the Heel Bone.	

A TABLE OF THE MUSCLES Made Uſe of in theſe *LECTURES.*

The Muscles *that move the Head.*

Splenius, *Complexus,*	move the Head backwards.
Rectus major, *Rectus minor,*	nod the Head backwards.
Obliquus inferior, *Obliquus ſuperior,* *Maſtoidæus,*	perform the ſemicircular Motion of the Head.
Rectus internus major, *Rectus internus minor,*	nod the Head forwards.
Rectus Lateralis,	nods the Head to one *ſide.*

The

The Muscles *that move the Neck; Back; and Loins.*

Longus, *Scalenus,*	bend the *Vertebræ* of the Neck.
Muſculi Vertebrales, *Spinalis Colli,*	pull the Neck backwards.
Longiſſimus Dorſi,	keeps the Body erect.
Tranſverſalis Dorſi,	moves the Body obliquely backwards.
Inter Spinalis,	draws the acute Proceſſes nearer one another.
Quadratus Lumborum,	draws the *Vertebræ* of the Loins to one ſide.

The Muscles *of the* Scapula.

Seratus minor Anticus,	draws the Shoulder Blades forwards.
Traperius,	moves them upwards, backwards and downwards.
Rhomboides,	pulls them backwards.
Levator Scapulæ,	pulls the Shoulder Blades upwards.

MUSCLES *moving the Arm.*

Deltoides,	lift the Arm upwards.
Supra Spinatus,	
Coraco Brachialis,	
Latiſſimus Dorſi,	pull the Arm downwards.
Teres major,	
Pectoralis,	moves the Arm forwards.
Tranſverſalis,	draw the Arm backwards.
Infra Spinatus,	
Subſcapularis,	

MUSCLES *moving the Fore-Arm.*

Biceps,	bend the Fore-Arm.
Brachiæus internus,	
Longus,	extend the Fore-Arm.
Brevis,	
Brachiæus externus,	
Anconæus,	

MUSCLES *moving the Hand.*

Pronator Teres, or *Rotundus,*	turn the Palm of the Hand downwards, & is call'd Pronation.
Pronator Quadratus,	
Supinator Longus,	turn the Palm of the Hand upwards, and is call'd Supination.
Supinator Brevis,	
Palmaris,	helps the Hand to graſp.

Pal-

Palmaris Brevis,	makes the Palm hollow.
Cubitæus internus,	bend the Wriſt.
Radiæus internus,	
Cubitæus externus,	extend the Wriſt.
Radiæus externus,	

MUSCLES *moving the Fingers.*

Sublimis,	bend the Fingers.
Profundus,	
Extenſor digitorum communis,	extend the Fingers.
Lumbricales,	aſſiſt in bending the firſt Joynt of the Finger.
Interoſſei interni,	draw the Fingers to the Thumb.
Interoſſei externi,	draw the Fingers from the Thumb.
Flexor Pollicis,	bends the Thumb.
Extenſor primi,	extend the Thumb.
——— *ſecundi,*	
——— *tertii,*	
Internodii Pollicis,	
Tenar,	draws the Thumb from the Fingers.
Anti-Tenar,	draws the Thumb to the Fingers.
Abductor indicis,	draws the Finger to the Thumb.
Extenſor indicis.	
Hypotenar,	draws the little Finger from the reſt.

MUSCLES *that move the Thigh.*

Pſoas,	bend the Thigh.
Iliacus,	
Pectinæus,	
Glutæus major,	extend the Thigh.
Glutæus minor,	
Glutæus medius,	
Triceps,	pulls the Thigh inwards
Pyri formis,	move the Thigh outwards.
Gemini,	
Quadratus,	
Obturator internus,	help a circular and oblique Motion in the Thigh.
Obturator externus,	

MUSCLES *moving the Leg.*

Semi-nervoſus,	bend the Leg.
Semi-membranoſus,	
Biceps,	
Gracilis,	
Vaſtus externus,	extend the Leg.
Vaſtus internus,	
Crureus,	
Sartorius,	croſs the Legs.
Membranoſus,	turns it a little outwards.
Poplitæus,	turn it a little inwards.

Muscles *moving the Feet.*

Tibialis Anticus,	bend the Foot.
Peronæus Anticus,	
Gaſtrocnemii,	extend the Foot.
Solæus,	
Plantaris,	
Tibialis Poſticus,	moves the Foot inwards
Peronæus Poſticus,	moves the Foot outwards.

Muscles *moving the Toes.*

Profundus,	bend the four leſſer Toes
Sublimis,	
Lumbricalis,	
Longus,	extend the four leſſer Toes.
Brevis,	
Flexor Pollicis,	bends the great Toe.
Extenſor Pollicis,	extends the great Toe.
Tenar,	draws the great Toe from the reſt.
Anti-Tenar,	draws it to the reſt.
Flexor Pollicis longus,	
Flexor Pollicis brevis,	
Abductor minimi Digiti,	
Interoſſei interni,	draws the Toes to the great Toe.
Interoſſei externi,	draws them from the great Toe.
Tranſverſalis,	brings all the Toes cloſe.

TA-

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FINIS.